भारत सरकार
GOVERNMENT OF INDIA
राष्ट्रीय पुस्तकालय, कलकत्ता
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वर्ग संख्या PP/36.
Class No.
पुस्तक संख्या 1872
Book No.

रा० पु०/N. L. 38.

MGIP (P. U.). Sant.—34 NL/93—9-6-94—50,000.

The Builder

AN

ILLUSTRATED WEEKLY MAGAZINE,

FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR, SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

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"Every man's proper mansion-house, and home, being the theater of his hospitality, the seate of selfe-fruition, the
of his own life, the noblest of his sonne's inheritance, a kinde of private princedome, nay, to the possessors there
whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and d

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VOLUME FOR 1872.

LONDON:

PUBLISHING OFFICE, No. 1, YORK STREET, COVENT GARDEN, W.C.

Wyman & Sons, Printers,
Great Queen St. London, W.C.

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The BUILDER

Prologue.

THE day that we head our paper with a new date, does not necessarily mark any definite step in our lives and circumstances. The world wakes up much as usual, and man "goeth forth to his work and to his labour till the evening" without any sense of change: the duration of the period indeed is connected with the mechanism of planetary revolution, but the precise point at which we mark it off is arbitrary, and might be as well fixed in June as January. Yet the tendency to regard this recurring season as a new starting point, an occasion for considering our position and our future work, is a natural and healthful one. It is a suggestion for a pause of inquiry as to the direction in which we are travelling, as well as an excuse for what the rowing men call a fresh "spurt." And so in wishing prosperous new year to all our friends, professional and non-professional, it will not be out of place to add a few words of suggestion as to the aim to be pursued by the representatives of architecture in the present day, if they would gain definite and enduring results from the work of this and the succeeding years.

Not that we are going to trouble our readers with an encyclopædiacal view of the position and prospects of architecture, which, indeed, would be in danger of running somewhat beyond the ordinary limits of our article. And there are many practical points, on the importance of which all are pretty well agreed, and which only stand in need of sufficient experiment and investigation, to be regarded with an equal unanimity as to the ways and means of accomplishing the desired ends. But there are other subjects on which no one seems to agree, or to be much nearer agreeing now than ten or twenty years ago. And if there is one subject more than another in regard to which doubt, difference, and contradictory opinions seem to be the order of the day, it is that still vexed question, often so hotly debated of late years, as to the form, the nature, the degree of the purely artistic element which is possible in modern architecture,—a question which, in some of its more recent forms, resolves itself almost into the inquiry whether there is really any such thing as architecture possible in the present day, anything comparable in importance and in beauty to the architectural remains of certain other epochs. Can we hope to say anything new or at all decisive on a subject which has been so much and so variously debated?

To a certain extent, the diversity of opinion on the question of style has been compromised. The "battle of the styles" is no longer carried on in its old form, and an armed neutrality prevails, consequent on the discovery and tacit admission, by partisans on both sides, that the mere revival of an old style will do nothing for us in the long run. A feeling of toleration has been established, partly owing to a really better insight into the principles of architectural style and design; and even one stern Goth is now content to admire and appreciate the beauties of Greek architecture, reserving his contempt for the detested "Renaissance,"—pooh-poohing Wren and all his works. It is satisfactory to find we have men so much greater than the architect of St. Paul's amongst us. More recently we have even seen another exclusively Gothic architect appearing as the champion of conservatism and respect in the treatment of our only Renaissance cathedral. This is so far well, as arguing the approach of a wider and more generalised view of the art of architecture. But there are evidences, among some of the most promising of our younger architects especially, of a growing doubt and dissatisfaction as to the whole status, the *raison d'être* of the profession of architectural design in these times,—a suspicion that the whole thing is possibly in some sort an anachronism: a feeling fostered, if not set on foot, by those who think themselves a rival body,—the engineers. And it must be said that such a feeling might not unfairly be prompted by the architectural history of this country for the last half-century. To the ordinary run of workers in the profession, those who are content to produce creditable and correct designs in the style preferred by their employers—with whom the profession is, in fact, nothing more than a "respectable" way of earning daily bread,—such scruples would not, of course, occur. But to those who take more serious view of the work of their life, and who would be glad to feel that they are busied about work that will not only give them a living, but will be in itself a benefit to society,—something which has to be, and ought to be, done,—the doubt whether they are not engaged in a mere fashion, pursuing a shadow, may occur with disagreeable force and frequency, especially in the face of all the remarks and theories from time to time put forth from one quarter or another. They see that Greek architecture was enthusiastically studied and practised by men of exceptional ability, yet that its modern productions have failed to satisfy either our practical or artistic wants; that modern Gothic architects have strewn the land over with quasi-Mediæval churches, of which people are already beginning to tire; and on the other hand architectural critics are ever found repeating that a new style cannot be deliberately made, and that some forms already in existence must be taken as a starting-point to work from. What is the truth out of all this contradiction? "Where shall we find the concord of this discord?"

The temporary character of the Gothic "revival," as it has mostly been practised, can scarcely be doubted. There has been such a blind admiration of everything Mediæval,—such a systematised copyism,—such condemnation of attempted progress,—the whole movement has been so closely associated with other mental tendencies and prejudices,—that architecture has been, in the main, reduced, more than at any other period to a great dilettantism,—a mere medium for assisting in the reproduction or depiction of the lifeless features of a past age and state of society. On the other hand, it is not to be supposed or expected that men with any strong feeling for the beautiful and picturesque in building, practising as architects in the present day, must or can shake themselves free from the influence of the monuments of a greater age of architecture: nor is the fact that they cannot do so a clear proof that there is neither artistic genius nor originality among us in this century. For it must be remembered that the productions of the greatest periods in almost every art,—those which remain as standard examples for admiration and imitation,—have arisen at a time when the best part of the mind and enthusiasm of a nation has been directed towards that particular object. The Italian intellect of the fourteenth and fifteenth centuries was directed to painting, as one of the noblest objects of life, which might well employ the powers of the first men of the day. The English intellect of the Elizabethan era poured itself out in the drama; that of the Edwardian period found its expression in architecture; and the excellence of the dramatic and architectural works of the two periods is to be traced, in great measure, to the fact that in each case dramatic and architectural art, respectively, formed the one chief outlet for artistic expression, to which everything else was subordinate and subservient. The mind of the present age is more active, perhaps, than at any of those former great periods of art-production; but it is divided,—its strength is spent and distributed over a score of different forms of expression. Could we, by any magical spell, shut out suddenly from the educated England of to-day all artistic interest, all media for artistic expression, except architecture,—could we, at the same

time, furnish the same opportunity and excuse for the erection of great buildings which existed in the Middle Ages,—we should probably see a new growth of Architecture before long, in forms as impressive as any already existing. But we cannot do this: only a small part,—a very small part,—of the national mind is given to architecture at present; and that part is not in itself strong enough to escape from the impression left upon the art by the builders of a more purely architectural age. It is the same in other arts: we see it in the enduring influence of the school of Italian painting; still more remarkably, perhaps, in the almost ineffaceable impress left by that purely æsthetic people, the Greeks, upon the artistic bent of mankind since their day,—as Lord Houghton has elegantly expressed it, in a little poem entitled, "The Flowers of Helicon,"—

> "And downward thence to latest days
> The heritage of Beauty fell,
> And Grecian forms and Grecian lays
> Prolong'd their humanising spell,
> Till, when new worlds for man to win
> The Atlantic's riven waves disclose,
> The wildernesses there begin
> To blossom with the Grecian rose."

Certainly this neo-Greek blossoming on the other side of the Atlantic may not be, if looked at closely, exactly the kind of thing that an architectural critic would be enraptured with; it may be paired off, perhaps, with that resurrection of Mediæval castles which a New York paper assured Mr. Ruskin he would find if he visited their city. But what we would indicate is, that the impress of the great age of every art, the age when that particular art was all-in-all to men, will not and cannot be effaced; that it must, and, indeed, ought, to influence those who aim at carrying on the same art in an age of more multifarious efforts and more divided aims. And, therefore, it is not fit that critics should hoist the black flag, and cry "no hope," because it is found scarcely possible to produce a pleasing architectural design in the present day, which shall not be largely based upon the features of one of the great styles of former times. It is natural and inevitable that it should be so. What is required is, that this adaptation from former styles should begin, so to speak, at the right end. The Gothic revival was not purely an architectural movement. It is a feature only in a temporary revival of modes of thought and feeling which were once part of the very life of the nation; a kind of blowing up of old embers, which is a very common phenomenon in history. Of this artificial revival, the modern Gothic architecture is part of the scenery; one of the "properties" of a very theatrical display. But it need not be used so. If instead of adopting the outer forms of the Mediæval buildings in the first instance, as we have mostly been doing in our churches, and fitting the use of the building to them, we begin at the other end, and, after considering the wants and requirements to be met, take suggestions from the Mediæval builders for their architectural treatment—hints to be worked out further, improved upon, adapted to the particular case in hand,—there is no reason why the study of Mediæval architecture should not exercise an influence in favour of, rather than adverse to, real originality. For originality consists quite as often in doing better, or in applying in some new manner what has been done before, than in absolutely creating a completely new form. We have instances among the works of modern architects,—not very numerous certainly,—in which this has been accomplished; in which we may see features and a mode of treatment clearly and ostensibly based on Mediæval models, and yet as clearly stamped with the modern designer's own individuality. And that designs so evolved may have a lasting and real artistic interest we may infer from comparing the results of a similar proceeding at another epoch in architectural history. We hold the Italian Renaissance to have been beset with serious, deep-lying faults and misconceptions, so far as architecture is concerned; but will any candid critic affirm that there is nothing in the designs, for instance, of Palladio and Sansovino—nothing in their working up and combining of classic details,—which has added to the domain of *inventive* design in architecture?

And it is in such consideration that we must find a reply to those who are inclined to look at engineering as the sole possibility in the present day. It has been suggested that the engineering works of this century are to us what the cathedrals were to the thirteenth century; that they may hereafter be studied as models, though some may not suspect it now. There is a sort of basis for this idea in the fact (as we believe it to be) that few great things that have been done in the world have been recognised as great at the time of their being carried out. Possibly the Mediæval architects had no idea that they were doing anything which would be the admiration of a future posterity, just as Shakspeare probably was not aware of the real value to mankind of the great dramas which he was so carelessly giving to the world out of his superabundant treasury of intellectual wealth. But is it at all conceivable that at any future period any one would think it worth while to sketch, either *en masse* or in detail, the features of our principal engineering works, from mere interest in them as beautiful and expressive objects? Can any lapse of time render the tubular bridge at the Menai Straits an object of pleasure to the eye? And in another point, too, the parallel scarcely holds good; for we should say the engineers of the present day have a very strong idea that they *are* doing great things, and make little concealment of their opinion on that point. The subject is recalled anew by the very suggestive paper "On the Progressive Use of Iron in Building," read at the Conference of Architects, and which we printed last week. The opinion therein expressed, that the true architectural work of the present days lies in the right and artistic treatment of iron, is one which is frequently paraded in different quarters at present, and in which there is a certain degree of truth. But, like many other people who have got a new hobby, the advocates of this view override it a good deal. Mr. Aitchison thinks we had better have everything ugly, so long as it is our own. The alternative is not quite so desperate as that. We wish to have things that are beautiful and pleasant to look at around us, if possible; and when the writer of such a paper implies in one sentence that he can see no beauty in the generalisation of foliage in a Gothic capital (calling it a "coarse burlesquing of nature"), and elsewhere finds admiration for so clumsy and bungling an artifice in building as the holding up of a long stone lintel by concealed iron supports, we must conclude his "common sense" to be a little stronger than his artistic sense, and receive his observations on such points with caution. But there is a fallacy in the parallel drawn between stonework and ironwork in architecture, which seems to be oddly overlooked. Iron is not, like stone and timber, a purely natural material: it is one mechanically and chemically worked up to a condition for use in building. It is, therefore, under different conditions practically and architecturally; practically, because we do not really know how long it will last; and architecturally, because it can never combine with landscape as a stone or even a brick building will. If the Mediæval builders had been acquainted with iron, and roofed their cathedrals with it, it is probable that not one such roof would be left now: and on architectural grounds, the parallel between the cathedral vault and the railway-station roof will not hold good, because it is evident that the builders of the former did look upon grandeur of effect as an object,—their buildings not being indeed utilitarian in a strict sense,—and it is certain that the designers or constructors of our railway-station roofs have no such aims. The point which might most reasonably be urged in favour of iron as the modern material, is that society is more changeable and mobile than formerly; that it may be more convenient to have comparatively temporary structures than vast piles made to last for generations. But even this argument, which would have a certain truth in it, we suspect would prove to be only very partially applicable. That iron is an important addition to our stock of building materials, and that there is an interesting problem for the modern architect in realising and perfecting a satisfactory and characteristic architectural treatment of it, is perfectly true. But why, because iron is discovered, stone should be any worse than before, we fail to see; and must label the dictum, which would call this the "iron age" of architecture, "not proven."

Another feature in the published report of the Conference proceedings, however, is suggestive; viz., the large space occupied by the purely practical papers, especially those dealing with treatment of new materials, and (on the whole, we must say) their superior interest and value. It is in the treatment of new practical requirements in general, and in the endeavour to bring these under the domain of architecture properly so called, that the most interesting and fruitful problem for the modern architect may be said to lie. And most particularly this may be said in regard to town architecture. We are obliged to crowd together, in towns, for the needs of manufacture, of commercial as well as social intercourse. To make our towns, our streets, by little and little less hideous, less depressing in aspect, without involving a disproportionate outlay; to render our private houses edifices pleasant and suggestive to look at, as well as comfortable to live in; these are points in which modern architecture with us has made but insufficient progress as yet, and in the course of endeavours to solve these the modern architect, if his interference be permitted, may find plenty of suggestion for novelty and originality of treatment. This kind of task, of course, seems prosaic, in comparison with the building of cathedrals, and yet it has its nobler side, too; and perhaps such humbler efforts, as they may seem now, would be as likely as any others to bring us to the "Golden Year," according to Tennyson's reading of it,—

> "Old writers push'd the happy season back,
> We forward,—dreamers both; for well I know
> That unto him who works, and feels he works,
> This same grand 'year' is ever at the doors."

THE COAL QUESTION NOT ADVANCED.

VAGUE statements of contradictory opinions, illogical inferences from stated premisses, blinking the main points at issue, and total failure to grasp the important question referred to them for inquiry, such are the salient features of the "Report of the Commissioners appointed to inquire into the several Matters relating to Coal in the United Kingdom." It may be thought that it was from a dutiful wish to frame their language on the model of the very questionable English employed in the phraseology of the Commission itself, that the Commissioners have so successfully avoided the use of that terse, idiomatic, perspicuous style which would have been proper to a practical report on a subject of such deep national interest.

In fact, it can only be considered as a solemn mode of trifling to refer a question which should have been entrusted to the skilled investigation of a competent civil engineer, to the *dilettante* hands of a Scottish duke and fourteen assessors. That respectable, even eminent, names are upon the Commission, there is no doubt. But what good service can the country expect from fractions of scientific or practical men bound up in an unorganised mass? "By snatches of time, now and then, from other duties," writes one, "I have got through my Coal Commission Report" (p. 71). "Preliminary estimates of the work to be done, and the cost incurred," writes another, "proved insufficient, both as regards time and cost." "I beg to record my earnest protest," are the words of the most eminent member of the Commission, "against the statement made in page xii. upon the probable existence of coal-fields under the cretaceous and other secondary rocks in the South of England." Mr. Elliot disagrees with the introduction into the Report of a calculation by Professor Jevons, the only calculation, by-the-bye, that has been verified by fact. Accord of any kind appears only to have been arrived at, by the careful suppression of any individual opinion, sage counsel, or practical issue of the five years' occupation of the Commissioners.

The Report commences with an elaborate statement of the mode in which the fifteen discordant Commissioners proceeded still further to pulverise their corporate existence by splitting themselves first into five, and then into seven, committees; the aptness of each of which for its task was insured by the original device, "that any member of the Commission should have leave to serve on any committee he pleased." It is true that the words follow, "in addition to that specially assigned to him." "The members chosen," it need not, therefore, surprise us to find, "proceeded, each on his own plan, to investigate." It is satisfactory to learn that, by "the 9th of June, 1871, the work," which had been authorised on the 28th of June, 1866, "had so far advanced that the reporters held their first meeting," when they "forwarded a draft report upon twenty-three sub-reports." We wonder how long Isambard Brunel or Robert Stephenson would have taken, to draw up a report on this great engineering question, which really would have shed some light on the prospects of the future.

The object of the Commission, or rather what

ought to have been proposed as an object for the serious inquiry of a competent man, whose entire attention should have been exclusively given to the investigation, can only be inferentially arrived at, from the boggling language of the Commission, which the Commissioners quote at the head of their Report. That object ought to have been three-fold. First, to ascertain what quantity of coal exists in the United Kingdom, within practical limits of economical working, regard being had not only to absolute depth from surface, but to thickness of seam, and to mineralogical value of coal. Secondly, to state the actual consumption of coal, and to show, too, in what ratio, according to the statistics now attainable, that consumption may be expected to increase, regard being had to any increase in the cost of working. Thirdly, to point out the indications thus afforded of the probable diminution, increased cost, or even general arrest, of the coal supply of the future, and to indicate such improvements, engineering or legislative, as may seem called for to prevent waste, or, in any other useful manner, to husband our supply.

There can be no doubt that a report that should reply to these questions, as intelligently and definitely as one of the great engineers, whose names we have mentioned, would have replied to them, would have been a statistical paper worth some outlay of public money to obtain. How it is that no such report has been even attempted by this cumbrous and protracted Commission, it is for them to settle with those who appointed them. They appear, in fact, to have been instructed in the most slovenly manner, and to have by no means bettered their instructions by their mode of carrying them out. We speak, it must be understood, of the general Report, rather than of the more shipshape details on which it is based.

The Commission, indeed, does call for a Report on the quantity of "coal which may be reasonably expected to be available for use." The mode in which this has been dealt with, is as follows:—"Doctor Sanderson,"—for it is characteristic of the Commission to hang their main assumptions on individual, and sometimes very slender, pegs,—"states it to be his decided opinion that labour is not practicable in moist air of a temperature equal to that of the blood, namely, 98 degrees, excepting for very short intervals." It is unnecessary to say that we fully agree with Dr. Sanderson, although a reporter more familiar with the subject might have stated the facts in a more practical manner. "The depth," the Commission continue, "at which the temperature of the earth would amount to blood-heat, is about 3,000 ft." We may remark that there is good reason (as admitted in a note) for calculating that this temperature, at which men cannot work, except for very short intervals, is attained at a depth of 2,690 ft., and that the pressure of damp heat upon the vital force is already considerable at 2,000 ft.; a matter of not much commercial importance in reviewing the question of cost. A margin of 420 ft. in depth is, however, added by the reporters, in virtue of a difference of 7 degrees in temperature, between the heat of the working faces and that which they impart to the air. The evidence, however, reduces that difference from 7 degrees to 3 degrees. This is a question not only of efficiency of ventilation, and of the length to which the "long-wall system of working," which is credited with this advantage, is carried from the shaft, but of actual earth-temperature. A further depth of 580 ft. (giving an additional rise in temperature of from 10 degrees to 11 degrees, and a corresponding amount of barometric pressure,—an element disregarded by the Report) is then allowed for "possible expedients which the future may elicit for reducing the temperature"! It is therefore "assumed that a depth of at least 4,000 ft. might be reached." At what cost is not inquired. That is to say, a theoretical addition of 1,310 ft., or of nearly 22 degrees Fahrenheit of temperature, beyond the depth at which, according to the evidence, men cannot work except for very short intervals, is "assumed" for the purpose of arriving at a round number of an agreeable magnitude. On this highly business-like and satisfactory assumption, the value of the labours of the Commission is made, in the first instance, to depend.

But we have not yet exhausted the assumption of Committee A. Even giving them their margin of 33 per cent. for contingencies, or for the possible outcome of lucky inventions, all carried to the credit side of the account, nothing is more certain than the fact, that a large proportion of the coal, above the limit of practical working as far as depth is concerned, will never be brought to the surface. The Commissioners have, indeed, admitted this principle by limiting their calculations to beds of more than 12 in. in thickness. But it must be borne in mind, that with every fathom in depth, the great expense of opening a mine, the sinking of the main shaft, increases. The deeper the mine, the greater the area of the subjacent mineral that must be wrought from a single shaft, economy being duly considered. Without attempting to fix the inferior limit of the bed which may be thus economically wrought at a great depth, it is evident that 12 in. is ridiculously under the mark. Indeed, the bathometrical limit must depend, in a great measure, on another element, entirely left out of sight by the Commissioners, namely, the mineralogical character of the coal. Between the total quantity of coal within 3,000 ft. or 4,000 ft. of the surface, and the total quantity of coal worth winning at these depths, there is an enormous difference. The Commissioners seem to think that if a spade is a spade, coal is coal. As to details of what every particular bed of coal is worth chemically, they evidently despise them. Have they not taken five years to make a report, such as it is? Would they not have required five-and-twenty years to frame such a report as we suggest? Let us be thankful for what we have got. If we are discontented, the Report has a word of comfort. "Every hypothesis must be speculative" (p. xvii.). Very true; but we hardly needed to go to a Cabinet Minister, and his colleagues, to be taught as much as that. In fact, a right acquaintance with the Greek tongue might lead any one to imagine that the phrase, though brief, is tautologous.

While thus the amount of coal practically likely to be worked is not even guessed at by the Report of this Commission, let us inquire how it fares with the second question, that which regards the probable future rate of consumption. Here, any one who looks at the Report with the admiration natural to ignorance, will say,—We have at least valuable matter! Here we have tables and diagrams, population curves, and decennial ratios! If the Commissioners do not know how much coal we have, they have at all events told us how long we shall be, before we expend that unknown "hypothetical" quantity.

Unfortunately, the same inability to make any practical use of the valuable information collected by the various committees, that characterises the Report under the first head, adheres to it consistently throughout. We are first told that 146,000 millions of tons of coal would last for 1,000 years, if burned at the rate of 146 millions a year; which profound arithmetical discovery is presented to us in two or three alternate shapes. A volume which was published in 1865 is then quoted, as giving an estimate that all our available coal will be exhausted in 110 years; and "yet another view" is placed before us, according to which, our supplies will last for "upwards of 1,273 years." Between these rather wide limits, the Report leaves its readers to please themselves.

It does, however, although still with the same conscientious fear of incurring the responsibility of an opinion, detail an intermediate hypothesis, which it illustrates by tables and a diagram. Nothing can more strongly show, to any mind accustomed to deal with statistical information, the puerile character of the Report (as distinguished from the materials on which it is founded) than the selection of these hypothetical illustrations for prominent publication. The increase of the population of Great Britain in the decade 1811-21, was 1,971,416. In the decade 1861-71, the increase was 2,737,416. The first increase was at the rate of 15·977 per cent., and the second at the rate of 11·736 per cent. Thus, with a very rapid and augmenting actual increase, the rate of that increase, calculated on the numbers from which the comparison starts, in each instance, shows a diminution. It is assumed that this diminution in the rate of increase will continue; and a curve is drawn on that assumption, which arrives at an estimated population of 132,000,000 for the year A.D. 2231; to which date the exhaustion of our coal is considerately postponed, by this calculation. It is, however, left out of sight that while the rate of increase diminished from 1811 to 1841, this diminution began to disappear in the following decade; while from 1861 to 1871 the rate shows, instead of a diminution, an increase of nearly 5 per cent., or of 14½ per cent. as compared with the lowest value. Any curve, then, that takes into account all the recorded facts, will differ most materially from that pro duced by the Commissioners. Indeed, the some what anomalous results of the seven censuses o the population, which form the element of the calculation, are such as to show, that we have as yet too few *data* to trace *any* course of proba bility, even for the next ten or twenty years. N serious and competent man, having his own re putation at stake, would have cared to give pro minence to such a mere shot in the dark as t "Population Curve," lithographed by the C missioners.

Connected with this totally imaginary cu is a tabular estimate of the consumption of c for the next four centuries, founded on the e traordinary assumption that, up to the yea 1931, the consumption per head will slowly augment, but that from that date until the final exhaustion of the coal in 2231 A.D., it will remain an exactly determined and equal quantity. Really the public should not be called on to read what are called estimates, framed in such a manner as this!

We shall continue the subject in our next.

"HISTORY OF THE GOTHIC REVIVAL."

THERE was once a poet,—we will not here associate his name with his unfulfilled prophecy,—who wrote,—

> "——— Doom'd to hide her banish'd head
> For ever, Gothic architecture fled."

But did Gothic architecture ever fly this land? Notwithstanding all that has been said about the Revival of Gothic Architecture, we doubt whether it ever really died out. Every one knows there have been, for the last 200 years or more, edifices erected in accordance with the sympathies created by a study of Classic literature; and every one also knows that these do not, altogether, represent the work of those centuries. It would be, indeed, difficult to draw any line that would show so short a period as thirty years in which the most eminent architects did not design in the Gothic style. Inigo Jones has the credit of introducing Palladian architecture into England, but some of his Gothic designs in country mansions are of great interest. Sir Christopher Wren's Gothic was eclipsed by the proficiency he attained in the Classic mode of building, but not only were some of his earliest designs Gothic, but one of the last works of his long life, the steeple of St. Michael's, Cornhill, was also in that style. He died in 1723. In 1747 Walpole wrote to his friend Conway, that he had taken possession of his new purchase, Strawberry Hill. In 1740, Sir Hugh Smithson and the heiress of the ancient Percies were married, and in the succeding years rebuilt a great part of Alnwick Castle in the Gothic style. "They are building at Northumberland House, at Sion, at Stanwick, at Alnwick, and Warkworth Castles," wrote Walpole of them, jeeringly. And when the year 1796 came, the great octagonal tower of Fonthill Abbey, that was to be as high as a cathedral spire, was begun. In 1826 Sir Charles Barry built his church at Brighton; and in 1839 the first stone of the Houses of Parliament was laid. So that, in truth, Gothic and Classic architecture have existed side by side.

Mr. C. L. Eastlake, in the work before us*, gives an account of the events and circumstances that have led to the almost exclusive study of Gothic architecture, so that architects are found who are proud to say that they know nothing about any other, and do not think it worth while to look at an example of any other, even when it comes in their way. Mr. Eastlake shares our impression of the continuity, rather than decay and regeneration, of the Gothic style, by explaining that it is "an attempt to show how the taste for Mediæval architecture, which lingered in England during the two last centuries, has since been encouraged and developed." A large feature of his book is a list of selected examples of Gothic buildings erected between the years 1824 and 1870; but he by no means limits his previous account to this period, for he begins with John Shute, and drops chronologically down past Inigo Jones, Wren, Holt, Batty Langley, Nash, Wyatt, and the rest, till he comes upon the men of our own time. We mention the list of selected examples, however, thus prominently because it appears to us to show the manner and measure of the author's bias, and of his knowledge of his subject. Some one

* "A History of the Gothic Revival." By Charles L. Eastlake, Architect. London: Longmans, Green, & Co. 1872.

has said we all work in grooves. Perhaps we do. But it is the duty of the historian to mount some eminence from which he can see the whence and whither of the men in other grooves beyond those immediately on either side of his own. His text is somewhat fragmentary, we must premise, for, perhaps necessarily, it consists of short biographies of architects interspersed with notices of their works, only varied by short accounts of buildings interwoven with notices of other architects; still, his views are for the most part well expressed in clear and forcible diction. Between forty and fifty views of buildings, or parts of buildings, illustrate the volume. A large proportion of these edifices belong to the last decade.

Taking up his thread from the hands of John Shute, "paynter and architecte," in the days of Queen Elizabeth, Mr. Eastlake dwells upon the services of antiquaries to Mediæval architecture. It was these worthies who trimmed the lamp of architectural lore, and kept it burning for us to find it alight. Dodsworth, Dugdale, Sir Thomas Herbert, Anthony, and Wood, he quotes as men who recorded the histories of Mediæval buildings; and Grose, Bentham, Hearn, and Gough as men who attempted to illustrate them. Between these two sets of writers he endeavours to insert the influences that brought it about, and notices early works after these were brought to bear. Of course, Walpole's writings are one of the chief influences, just as, a little later, Sir Walter Scott's are believed to have been another. The seat of Lord Dacre, in Essex; Adlestrop Park, Gloucestershire; Beeston Hall, Norfolk; and Cossey Hall, in the same county, are given as early examples of the revival. Lee Priory, "Gothicised" in 1782, by the elder Wyatt; Milton Abbas, in Dorsetshire; Arundel Castle, Sussex; Ashburnham-place, Sussex, designed by Dance; and Swinton Park, Yorkshire, which passed through the hands of James Wyatt, are also cited as belonging to this period. After the works of Grose and his contemporaries, Nash's buildings are mentioned side by side with those of Wyatt. The works of Dance, too, are placed in this fresh category as well as in the first. Donnington Hall, Leicestershire, by Mr. W. Wilkins; Stanley Hall, Shropshire, by Mr. Smalman; and Ditton Park, Somersetshire, by Mr. Atkinson, are referred to as revival works executed in the young days of the present century. Eaton Hall, as designed by Mr. Porden, 1803, is shown in a view. Some of Robert Smirke's works are next slightly mentioned, before a biographical notice of John Britton stops the list. Full credit is accorded to this remarkable man for the great impetus he gave the revival, especially in the amateur world, by his publications. Pugin and Willson furnished more professional aid when they produced their "Specimens of Gothic Architecture;" but Britton's "Beauties" diffused a general association of Mediæval remains with the picturesque. Carter's labours are also dwelt upon. The publication of practical and accurately illustrated books, Mr. Eastlake considers to be the real turning-point of the revival. They furnished precise knowledge of details, which it was easy to reproduce faithfully. Hence the revival speedily passed into a stage where a precedent was required for every arrangement of parts and for every ornamental detail. This fettered period, according to the author, lasted down to 1850. Is it over yet?

Rickman is placed foremost in the list of architects who were also antiquaries. "His works are, perhaps, the finest of that period in which the details of old work were reproduced with accuracy of form," says the writer. He built churches in Bristol, Leeds, Preston, Liverpool, Carlisle, and Canterbury; and mansions in Northumberland, Staffordshire, and near Liverpool, Bristol, and Carlisle. He also built St. George's Church, Birmingham, in the churchyard of which he lies buried. His "Attempt to discriminate the Styles of English Architecture" did more to give precise knowledge than his structural works. Mr. Eastlake observes of this time, "It is a remarkable evidence of the inferior place which Mediæval art still occupied in public estimation, and of the caution necessary in any departure from the much-revered canons of classic taste, that Rickman should have prefaced his book with a formal description of the Five Orders. What possible connexion they can have had with "English Architecture from the Conquest to the Reformation" it is difficult to conceive, and one can only suppose that this first section of the volume was introduced as a peace-offering to the shade of Vitruvius. No wonder, however, need be expressed, for Rickman's object was, as he states in his preface, to give "a view of the principles of architecture," and, of course, he could not do that without an account of the antique modes from which the modern modes proceeded. Among architects who were young and "rising" in Rickman's day, Shaw, Scoles, Mr. Salvin, and Mr. Poynter are mentioned as likely to have been stimulated by his labours. Mr. Blore is classed as another "pre-Puginesque" architect; and then, dismissing Savage with, of course, qualified praise of his church at Chelsea, we are introduced to Pugin, "whose name marks an epoch in the history of British art." From Pugin we come to Barry and the Houses of Parliament.

The last two great names are disassociated from their surviving contemporaries and immediate successors, by an account of the churches built in conformity with the Act of 1818, for promoting the erection of additional churches. A Royal Commission was appointed to carry the Act into execution, whose reports show the gradual growing preference for Gothic designs very clearly. As at first specified, they are "Roman of the Tuscan order," Grecian Doric, and Gothic; then York and Lancashire take the lead in adhering exclusively to Gothic. A history of the Ecclesiological Society, from its formation as the Cambridge Camden Society to its removal to London, and that of the Oxford Society, serve to increase the distance between the two names we have mentioned and their juniors, and at the same time afford an introduction to some of the prominent members of the profession at the present day. At this point we find ourselves just half-way through the history. "A large proportion of the modern Pointed structures raised between 1840 and 1850 were copied either entirely or in part from old examples, and perhaps it was the best thing that could have happened. For, with a few brilliant exceptions, which it would be invidious to name, no architects of that day could have been trusted to work, as many have since done, in the *spirit* of old art alone, and without borrowing largely from their books and sketches," says Mr. Eastlake. St. Andrew's, Wells-street; its neighbour, All Saints'; St. Stephen's, Westminster; St. Barnabas's, Pimlico; St. Mary Magdalene's, Munster-square, are mentioned in succession as indicating an advance in the prospects of the revival. "St. Mary Magdalene's," continues the writer, "was, perhaps, the last church of any note erected in London before the revival became sensibly, though by no means universally, affected by certain new doctrines of taste in architecture—doctrines which were proclaimed from an unexpected source, and which at one time bade fair to revolutionise and reform those very principles of design that Pugin had recently laid down with so much care." We look through the next few pages, which are devoted to Mr. Butterfield and his works, with curiosity to ascertain more of the "new doctrines of taste," but the explanation is reserved for a fresh chapter. Mr. Ruskin is the preacher of the new faith. It was his extension of the field of precedents south of the Alps, his placement of Pisan Romanesque, Florentine of Giotto's time, Venetian by the side of Early Decorated Gothic, as fit for adoption in this country, that affected the architectural world so remarkably. Previous apologists for the Revival had relied more or less on ecclesiastical sentiment, on historical interest, or on a vague sense of the picturesque for their plea in its favour. It was reserved for the author of the "Stones of Venice," writes Mr. Eastlake, after giving Ruskin a series of hard rubs, "to strike a chord of human sympathy that vibrated through all hearts, and to advocate, independently of considerations which had hitherto only enlisted the sympathy of a few, those principles of Mediæval art whose application should be universal." Good-bye to Pugin, to the Ecclesiologist, and the rest of the recent leaders of the blind. The University Museum, Oxford, is illustrated as an example of the effects of the new teaching. But though a foreign element was thus imported into designs for houses and civil buildings at an early date, ecclesiastical architecture remained impregnable for some time. We quote what may be considered the pith of the writer's creed in his own words. "In 1850 and 1860, however, the list of English architects who devoted themselves more especially to the building and restoration of churches was largely increased. Messrs. E. Christian, J. Clarke, S. S. Teulon, and J. H. Hakewill, were among those who followed, with more or less tendency to individual peculiarities, in the footsteps of Mr. Scott; while a certain number of younger men, including Messrs. G. E. Street, H. Woodyer, W. White, and G. F. Bodley, showed an early inclination to strike out in a new line for themselves." After this Ruskinism began to pale before a new influence, Viollet-le-Duc's publications. Mr. Slater's Digby Mortuary Chapel at Sherborne, Mr. J. F. Bentley's baptistery to the Church of St. Assisi, Notting-hill; Mr. Street's churches of St. James the Less, Westminster, St. Philip and St. James, Oxford, and St. John, Torquay; and Mr. Pearson's Church of St. Peter, Vauxhall, are described in succession as of a French character. A few instances of modifications, versatility, and power of adaptability, as shown in various buildings illustrated:—All Saints' Hospital, Eastbourne; Cloverly Hall, Whitchurch, Shropshire; Leyes Wood, Sussex; Abbey of St. Scholastica, Teignmouth; Knightshayes, near Tiverton; the new buildings at Balliol College, Oxford; Humewood, Wicklow; and the churches of St. Chad and St. Columba, Haggerston, and that of St. Stephen, Hampstead, complete the volume.

One cause of the improved aspect of modern Gothic buildings is the comparative culture of a certain class of workmen now ready and able to assist the architect in the execution of his ideas. Of this our author says but little. Stone-carvers should be especially mentioned; or take the smiths, who can so deal with metals, there spreading them out in floriated hinges, here doubling them into cunning locks, and here again, for the altar-rail, for instance, trailing them into wonderful curves like so much trained foliage, that they become almost the fittest parts of the whole.

Mr. Eastlake's book is chiefly a book of to-day for to-day. It is digressive and recapitulatory, but it is smart, and written with understanding. On the prospects of the revival he is silent, because, he declares at the outset, he could not say any more on the subject than has already been said. The work is damaged by such an amount of overpraise of some of the author's friends as would induce a very erroneous notion of the present position of architecture in this country.

A NEWSPAPER LECTURE TO ARCHITECTS.

ARCHITECTS cannot be too thankful for some words of wisdom and counsel in regard to the Law Courts controversy given them by a daily paper last week. Whilst other publications are lending their columns to elaborate criticism and condemnation of the proposed design, the *Daily News* takes the common-sense and truly-practical view of the question in debate, and reads architects a lesson not only in æsthetics, but on the amenities and moralities of conduct also. Part, at least, of this good advice it becomes almost a public duty to give further currency to:—

"Mr. Street's plans are ready to be used as the guide for the practical builder. Instead of this conclusion to a long and bitter controversy being welcomed by professional men as it is being welcomed by the public, the candid critics of Mr. Street are becoming more active and virulent every day. The battery of carping is now reinforced by the heavy guns brought to bear by Mr. Fergusson in *Macmillan's Magazine*. For Mr. Street, personally and professionally, Mr. Fergusson avows the profoundest respect and admiration. But, like other critics who are sighing over the degeneracy of modern architecture, Mr. Fergusson enters a warm protest against Mr. Street's design. He wishes to see a building erected which shall not recall a bygone age, but shall manifest the spirit of the present time. Practically this means such an edifice as the Post-office, or one of our railway stations. These edifices are types of modern architecture. Yet what would be said if designs of the same character were adopted for the Law Courts? Would not epithets of abuse and denunciation crowd indignant letters from irate architects? The wonder is, that in this long and angry controversy two points have been overlooked. The one is, that there must be an end to talk and writing if any work is to be accomplished; the other is, that fair play should not be denied to an architect even by his brethren. No matter what design be proposed and accepted, professional malcontents will find reason for complaint and remonstrance."

"We hope here be truths." It is always gratifying to receive instruction from those who are competent to give it; and the certainty and *aplomb* with which the writer's views are expressed is the more interesting (may we not add, surprising?) as occurring in a publication which has hitherto appeared somewhat to neglect architecture and architectural criticism. But in this praiseworthy desire to set the thing in its true light, the writer is scarcely quite charitable to the persons whose interference in the matter it deprecates. Mistaken as architectural critics may be,—foolish as their attacks may seem to the more thoroughly educated mind of the writer,—he should have

remembered that even architectural critics, if possessed (however erroneously) with a strong conviction that an unsatisfactory building is going to be erected at immense expense, and that its erection will amount to a throwing away of the finest architectural opportunity of this generation, may think that they have grounds for opposing such erection, quite apart from any feelings which deserve to be called "virulent" or "malevolent." It is instructive, too, to be informed, on such good authority, what the "type of modern architecture" is, and that there is no mean between wild Mediævalism and the New Post-office; but if the latter reference be meant for a fling at Mr. Fergusson, it is fair to remember that that gentleman has publicly and very clearly implied (though not feeling at liberty to make a direct statement) his non-complicity in that design, save in regard to some retouching and shaping.

Again, it would be a little rash to conclude that, because the *Daily News* can give no good reason for admiring Mr. Street's design, those who dislike it are necessarily in the same irrational predicament. We must protest, too, against the wholesale imputation thrown on the non-professional public by the statement that they are ready to "welcome" the termination of the dispute by the adoption of the present design, whatever its defects.

The English public know very little about architecture, certainly, but they (necessarily) know still less about this particular design, of which they have had but small means of judging; and to assert that they do not care what kind of building is put up in the metropolis, provided it answers its practical object, would be to infer that they are even more ignorant and indifferent about art than is really the case.

HAMMER-BEAM ROOFS.

AT the meeting of the Architectural Association, held December 29th, 1871, a paper was read by Mr. W. White, F.S.A., on this subject, suggested for special consideration at a visit by some members of the Association to Eltham Palace a few months ago. The roof of the old hall, standing on walls dislocated by its action, might seem to discredit the principle of hammer-beam construction, if on examination it did not appear an instance of its imperfect application. The roof, although elegant in form and detail, is found to be very faulty compared with numbers of the other remaining specimens of its kind. The walls above the corbels are thrust outwards, and otherwise displaced; the framing of the principals has opened at the ridge, collars,—at most of the joints, in fact, of several of the trusses. The hammer-beams extend very slightly over the walls; the weight of the principal rafters descends within, instead of, as is usual, on the outer faces of the walls; on the depression of the end of the hammer-beams caused by subsidence at joints, rendered more largely by the flatness of the curved braces under the collars, the hammer braces have acted as powerful levers on the walls, submitting naturally to strange changes in their own forms at the same time. A combination of defects being found in this example, Mr. White considered carefully the various theories current as to the principles applied in these roofs. The idea that a system of equipoise was the aim of the constructors, though not unreasonable or entirely unsatisfactory, did not carry sufficient conviction to his mind to prevent him from considering that further investigation was necessary. His idea was, that trussing and tying, the intentional use of timber in a state of tension, were present in these combinations, as well as the more obvious and generally recognised corbelling and strutting. Dissecting the arrangement of the Westminster Hall roof, he found it probable that the great curved braces, assisted by the under-braces forming the trefoil, acted very frequently as ties, incapable of sagging or straightening, and thus of movement at their extremities. If this could be established,—with pendant pieces, principal rafters, and collar-beams in compression,—there would be found all the necessary parts of a true truss in the modern and customary sense; a construction in which the whole of the principal timbers are either pushed or drawn in the direction of their length. Though not in possession of a large amount of the kind of information required, only to be got by a minute examination of the joints of a number of roofs, in order to detect and appreciate the various halvings, tenoning, and pinning, he thought he had found some confirmatory facts which would lead him to look still further into the matter; he, for his part, could hardly regard with ready acquiescence the statement often made that the course of Gothic roof construction in England "consisted in the substitution of frames of wood for arches and gables of stone, carrying Mediæval science from one material to another, and infusing into carpentry constructive principles that were previously the mason's own." The theory of equipoise, that might be summed up shortly as the balancing of the weight of the upper portion of the roof on the overhanging end of the hammer-beam against the weight of the lower portion on the other end of it pressed down by the principal rafter on the wall,—the top of the wall-piece or pendant posts being a kind of fulcrum,—this theory supposes, almost of necessity, much forgetfulness by the old builders of the resistance of timber to tension. In view of the dignity and harmony with the masonic forms of large, grand architecture attained in the use of solid beams, of large scantlings,—dignity and harmony hardly possible with the use of more meagre scantlings nowadays; he was inclined to look for, what he thought he had found, viz., a not unscientific use of materials, a construction without parade of its triumph, but intentionally containing provision against the remoter as well as the immediate future. In the bulk,—considered as a new construction, we should now say the wasteful bulk,—of these timbers was lodged a reserve of power capable of being turned to new uses when slight failures, and perhaps varying conditions, altered the disposition of the strains. The roof of Westminster Hall, requiring only such maintenance as any building might be expected to call for after standing near upon 500 years, showed practically that the defects so readily seen at Eltham Palace Hall were not derived from the older example, which had within itself the means,—not of self-destruction, but of re-adaptation and of endurance.

The paper was illustrated by sketches and by many diagrams on the black board, which it would be necessary to reproduce in order to give in full what has been outlined above. The "Illustrations by H. Dunnage and C. Laver, of the Palace at Eltham, with Essay, 4to., London, 1828," give the jointing of the roof with considerable care; though Mr. White thought he had detected a different treatment in some of the several principals. A discussion followed, and some opinions were expressed as to modern iron roofs, and their comparatively small chance of long endurance; the light rods used to provide against tensile strains have, it was stated, no reserve of strength to make them ready in case of new demands, in heavy gales, and other sudden changes of stress. Setting aside the inevitable, as it would seem, decay that will in no very long time demand the renewal of every iron structure, there are often other operating causes of disturbance, making one look with some satisfaction on the sober, simple construction, and the massive timbers, of the Gothic roofs. The lesson from the Eltham failure,—to give all cantilevers much solid bearing,—and other practical points, were dealt with; and the meeting separated with a vote of thanks to Mr. White, and wishes for a Happy New Year for all from the president.

NEW SYNAGOGUE FOR LIVERPOOL.

A NEW synagogue being required for the old Hebrew congregation, at present in Seel-street, a select competition was decided upon, and six architects were requested to furnish designs. Two of the invited architects declined to compete, and the remaining four accepted the invitation, namely, Messrs. Audsley, of Liverpool; Mr. Collins, of London; Mr. Grayson, of Liverpool; and Mr. Salomons, of Manchester. On Sunday, the 10th ult., by the votes of the free members of the congregation, the designs were reduced to two for further consideration; and ultimately the design by Messrs. W. & G. Audsley was selected to be carried out, and to Mr. Collens was awarded the second premium.

The style of architecture adopted by Messrs. Audsley is Saracenic, treated with freedom. The building is to be executed in brick and stone, richly ornamented. The western front is in five graduated divisions, separated by octagonal and square turrets, terminating in domed canopies. A large doorway in the centre division gives admission to a vestibule, extending the whole width of the building, and flanked with the staircases to the ladies' galleries.

The interior is spacious and lofty, and is divided into nave and aisles by columns and arches. The nave is covered with a vaulted ceiling, and the aisles by sloping panelled ceilings. The interior will be lighted by two orders of windows in the side walls, and a clearstory over the arches of the nave. At the east end of the building is placed the Ark, and behind it the choristers' gallery. The building is to be erected in Prince's-road, near the Church of St. Margaret.

EIGHT PLATES OF COAST SCENERY.

"COAST SCENERY,"—the title seems to smell of the sea. It carries us off from dingy London to some daisy-carpeted southern down or northern link, looking out over bay or frith; from murky mid-winter, with the gas burning at noon, to the early autumn, with pater and mater-familias and their brood, rushing off north, south, east, and west, to the seaside, with that fondness for the water which is part of the nature of the city-pent Englishman.

The title above quoted indicates the presentation work, provided for the current year, for the members of the Art-Union of London, each of whom receives, for his guinea, besides the chance of a valuable prize in the general distribution, this series of impressions of eight steel plates, engraved from drawings by David Cox, Copley Fielding, and Samuel Prout.

It is only necessary to hear these names to be assured of the high quality of the works, and the originals have been worthily interpreted by the burins of Mr. Willmore and his coadjutors.

We believe that that penchant for the sea we have noted will induce a great many people, who are only infants in art, to covet these plates; while the artistic quality of the work will tempt many who do not care much for the sea.

The views, though the same theme runs through them all, embody such different states of weather, &c., that monotony is satisfactorily avoided.

We have the calm summer evening, the setting sun lighting up the "Hulks," after Sam. Prout, which show the graceful sweep of line and careful touching in of detail in which he so delighted.

"Off Teignmouth," we have a short chopping sea, and the dark, driving clouds indicating rougher weather to come.

"At Beaumaris," while the sun still shines on the church and the houses along shore, the sea is getting rough, and the men in the boat are hastily getting down their mainsail.

In "Plymouth Sound," the contrast between the pitchy cloud in the background and the mainsail of the yawl and edge of the fortifications touched by the setting sun is exceedingly effective.

Taken as a whole, we do not think this Society has ever produced an annual work likely to please a larger number of people than the present. We cannot see that anything can be found in it to cavil at.

We notice from the return given in the report lately printed by the council, that in the last distribution the proportion of prizes was rather more than one to every twelve members, and we are mistaken if this year's issue, aided by the greater general prosperity of the country, does not greatly raise the proportion of prizes next April.

At a time like the present, when every institution, from Royalty to Bumbledom, is on its trial, and there is no title so sacred but that some one may be found with boldness enough to question it, it would be well for each one if it could show as good a *raison d'être*, as the Art-Union can, in pointing to such works as those now produced.

The New Library at Lincoln's-Inn.—For some time past the benchers of Lincoln's-inn have determined to appropriate some of the funds in their hands to the construction of a new wing to their library attached to the hall, which has of late years been found inadequate to accommodate the number of students who are in the habit of frequenting it. The design has now being carried out, and an additional building, 50 ft. in extent, is being rapidly constructed on the east side of the original structure, and immediately fronting the side of Vice-Chancellor Malins's Court, which will produce a new building of nearly 110 ft. in length.

AGRICULTURAL PIPE DRAINAGE,

IN CONNEXION WITH ARTERIAL DRAINAGE AND OUTFALLS.*

OUR president, in his opening address, at the commencement of the last session, kindly referred to my paper "On Arterial and Agricultural District Drainage" (vol. i., p. 71, of the Transactions), and expressed a wish that our Institution should be put in possession of the details, both of the execution of pipe drainage and of its effects upon land.

Although the general results of drainage cannot but be well known to most of those to whom this is addressed, I venture to comply with the President's call, and will endeavour to place on record such information as I possess upon the subject.

Arterial drainage and outfalls are, as I have before stated, the leading works in all systems of land drainage, and to them I have paid particular attention as the means by which minor or subterranean drainage can be carried out safely, effectively, and permanently; but without a knowledge of the requirements of pipe drainage, arterial drainage cannot be properly designed and executed.

It may be remembered that in the paper referred to by our President, several methods are described by which arterial drainage can be accomplished, and it is shown that it must be dealt with in a scientific manner, and on an extensive and comprehensive scale, in order to prevent floods, to control the supply of water for all agricultural and social purposes, and to provide for the deep drainage of open ditches, and for pipe drainage.

Those who are familiar with this kind of draining, must have understood that the end of all pipe drainage, let the depths be what they may, is to keep the subsoil water at such a level as not to allow it to rise to the roots of the plants, injuring their growth by its coldness and non-fertilizing properties, and to render the soil above the pipes more friable and open, by making it moderately dry, and causing a circulation of air through it.

A very prevalent opinion existed that the sole use of pipe-drains was to take off to an outlet water which descended upon the surface of the land, as rain, or overflowed it from springs, &c., and with many farmers this idea is still prominent, and they cannot understand that if drains are sunk in clay soils as deep as 4 ft., the drainage water will ever reach them, or the land ever be improved; and if left to themselves, they would not lay the drains deeper than 2 ft. or 2 ft. 6 in.

I have many times tried to convince them what is the source of the water, by showing it to them by trial holes dug in stiff clay, and asking them where they thought it came from, as there was no appearance of its having run down the holes from the surface of the land, or of it having percolated from the sides of the holes. I have shown them that it could only rise from the bottom; but in few instances only have I found that the conviction, even if arrived at, lasted very long. I have also shown them that, after a drain has been dug out to its proper depth, in a few hours water will gradually rise where there was none before.

Many instances are well known in which shallow draining, say from 2 ft. to 2 ft. 6 in., has been taken up and the pipes relaid at depths of 4 ft. and upwards; and it is scarcely possible to believe that in the present day persons can be found who would practise shallow in preference to deep drainings. There have certainly been failures in deep draining, but these have arisen from imperfect work; either the pipes have not been laid in a true line in the drains, or proper attention has not been paid to the fall or inclination, or, more frequently, to the distances from each other at which the drains are laid.

When the soil between the drains has been rendered perfectly permeable, so that rain water sinks to the full depth of the drains, and the subsoil water rises up to their level, the work may be deemed to be satisfactory, as showing that the drains have not been placed too far apart, having regard to the depth in the particular soil which is being treated.

Many persons, being desirous of saving the cost of deep draining, have placed the drains closer together—with shallower depths; but it will be found that this system entails a greater cost and is not so efficient or durable. The table, which will be found under the head of cost, shows the several rates per acre at various depths and widths apart.

The alternative, in case of a defect either from the pipes being laid at an insufficient depth, or too far apart, is to do the work over again or to allow it to remain a lasting disappointment.

I will now proceed to direct your attention to the practical parts of the question, and will first deal with the nature of

Soils.—In laying out drainage the principal difficulty in determining both the depth and width apart of drains, is found in dealing with the different kinds of soils that are met with. The first question that naturally arises is,—what is the geological formation of the locality? and what is the inclination or dip of the strata? From the answers to these questions we are able to infer the existence or absence of permanent springs. Thus, for example, beds of gravel, sand, or other free soil, surrounded or underlaid by beds of clay or other impervious strata, store up large bodies of water, which by slow percolation saturates the surface of the country. So that we can in such cases, by simple means and a small amount of work, free large areas of land from wetness. A knowledge of the soils may be gained by sinking trial holes, exceeding in depth the proposed drainage, or by boring to moderate depths.

The depth from the surface with which it is necessary to deal is really very small as compared with the great masses of material which make up any geological formation; but, nevertheless, it is highly necessary that the engineer should investigate every feature of the soil, the form of the land, its inclinations and produce, in order that he may be able to lay out the work to be executed both efficiently and economically, as well as in the manner best suited for the future improvement of the land. Soils may be classed in two grand divisions—clays and free soils, and it is these we have to deal with; but it must be remembered that each of them admits of several subdivisions, and in both cases rock may be mixed with them.

Depths of Drains.—In all cases in which loans of money are made by the drainage companies under the powers of their Acts, the Inclosure Commissioners, who sanction the charge upon property for the repayment of the loans, require 4 ft. to be the minimum depth of pipe drainage, and experience has fully confirmed the good effects of this rule, after several years' practice. This minimum depth has been fixed after mature deliberation; but it ought not to be imperatively insisted upon in every kind of soil or under all the varying conditions of land.

One constantly meets with the objection that water cannot get down through thick clay, and that it is useless to go so deep as 4 ft.; but our experience teaches us that the soil, having become more loosened and opened by cracks, admits the permeation of water to that depth at least; the very worm-holes permit the water to percolate, and after it has once found its way, by gravity, through the soil, by innumerable small passages, it never ceases, year after year, to continue the same course, until the whole depth, from the causes before cited, namely, the prevention of the capillary attraction upwards of ungenial water, the admission of air by the pipes, and the gradual filtering of rain from above,—is totally changed in character from that of an obdurate and untractable soil to that of a more genial plant-producing one.

The same effects are produced both in arable and pasture lands, but the system to be adopted in draining them is somewhat different. I have hitherto endeavoured to prove that there is a certain minimum depth at which pipe drainage is capable of producing the best results, more particularly when applied to stiff clay.

Distances apart.—I think a general rule might be established to determine, in connexion with the depths, the distances at which the drains should be placed apart from each other, and that is that the width should be a multiple of the depth: for instance, 4-ft. drains may be 16, 20, 24, 21, 32, 36, or 40 ft. apart, the depth being first found at which the level of the water-bed stands beneath the surface. We must then judge, from the nature of the soil, whether it will allow of the water finding its way, for half of any of the above widths, to the pipes, always bearing in mind that water will find its way most quickly to a vacuum or the point of least resistance. Take, again, any soil in which it may be found that the water level stands at 5 ft. deep, the multiple may be 40, 45, 50, 55, or 60 ft.; and so with 6-ft. drains, the widths may be 60, 66, 72, 78, 84, or 90 ft. The drainer's judgment and experience will enable him to determine at which of these widths the particular soil which he finds will act best, remembering again that each line of pipes, *i.e.*, each drain, only influences half the distance between it and the next one on either side of it.

The depths of pipe drains can be determined (as we have already seen) by many conditions of the soil and of the water-beds as they are found in the land; but the determination of the widths at which the drains should be laid apart requires much practical knowledge of the nature of different soils, especially as regards the facility with which they allow water to percolate through them, the object being to drain arable land sufficiently, while not overdraining grass land. The expense is lessened considerably when great widths can be attained, even at an additional depth. The rate I have before referred to as the measure of the width would still require the judgment of the drainer to decide what soils will be properly drained by any of those distances apart.

Inclinations or Slopes of Drains.—Owing to the constantly varying slopes of the country, scarcely any rule can be absolutely laid down for the inclinations at which the pipes should be laid. The greatest attention is required in laying the main pipes, into which the smaller branch pipes run. In flat countries they should always be set out with the spirit-level, and the depths from the surface given to the men at every one or two chains along the line. Water will run freely at inclinations of 1 ft. fall to 1,000 ft., 2,000 ft., or 3,000 ft. of length, where the pipes are well laid; but it must be observed that at every junction of a branch pipe the flow will be impeded in the main pipe by the water entering from the branch pipe, sometimes running with considerable velocity. So that as much inclination as possible should be given to the mains, in order that the hydraulic pressure may force the current towards the outlet. The inclinations of the minor or branch pipes must necessarily be controlled by the natural slopes of the ground. In a general system, laid out on a definite plan, it is better to have as few outlets as possible, and I need hardly say that all the minor or branch pipe-drains ought, at their lowest ends, to be united or joined up to one main pipe of such larger dimensions as may be proportioned to, and capable of discharging, the water from a given area of land; these larger pipes being conducted to the lowest extremity of the area to be drained, and there discharged into an open drain or stream.

The cost of long lengths of large pipes, increasing in size as they go, raises a question as to the expediency of using them, but the work is easier to maintain than when a large number of outlets is used.

I have frequently found it most useful, in laying both large and small pipes, where the bottoms of drains are in soft, boggy, or sandy soils, and there is every probability of the pipes sinking or getting out of their proper inclination, to lay them on strips of wood cut out of three planks of elm, or other timber as durable in water, from ½ in. to ¾ in. thick. The cost is very trifling, and is as nothing compared to that of having to re-open and relay the drains, while doubt of the success of the work is thereby to a great extent avoided.

Outlets.—The pipe at the outlet or head should be raised above the ditch or stream, which should be cleared, and, if required, deepened for some distance, so as to ensure the water not being backed up into the pipes. I have adopted self-acting iron traps at the outlets, in cases where the tide has occasionally risen against them; but the chief object was to prevent the mud, of which there is generally a large quantity in tidal waters, from being taken up the pipes, and there left to deposit itself. All outlets should be protected by brick or stonework, set in mortar or cement, the foundations being sunk from 1 ft. to 2 ft. under the bottom of the ditch or stream, which should be paved to recive the water from the pipe.

Referring again to the depths of the drains, it is frequently necessary to lay the main drains 6 ft., 7 ft., 8 ft., or even 10 ft. deep in places, in order to drain land to an outfall, which lies at too low a level to allow of the ordinary depths being employed.

Sizes of Pipes for certain Areas.—In all engineering questions relating to the flow of water through pipes, there are fixed rules for ascertaining the quantity discharged, when running full, according to the size of the pipes, their

* By Mr. Richard Boxall Grantham, C.E. Read at the Ordinary General Meeting of the Institution of Surveyors, December 18th, 1871, Mr. Edmund James Smith [illegible] in the chair.

inclinations, and head or pressure above the point of entrance of the water into the pipe. But in the case of pipes in land drainage, which are not as a continuous tube, no rule can be applied to measure the quantity that flows, so as to adapt the sizes of the pipes to the particular cases in which they are employed, because the quantity of water which is taken in is very uncertain, and in some cases most irregular, and the inclinations vary at every change of surface, so that in some parts of the same pipe the velocity is very great, and at others very small. It is seldom found that the same amount of water is discharged out of any two pipes in the same field, and this is frequently the case even when they are side by side. The quantity of water varies very considerably under the different conditions of soils in which the pipes are laid; for instance, in free soils with springs, and in times of much rain, which penetrates quickly, all the pipes will run full, and likewise, at times, in free soils with rain alone. In free soils the percolation of water in suspension through the soil being slow, and rain water also descending slowly, the pipes are not overcharged; besides, in such soils, the pipes are at more frequent intervals, and would, if the water came as rapidly as from the free soils, discharge it more easily. In the early period of land drainage, pipes of 1 in. diameter were commonly used, but they were not continued for any length of time, and they were seldom if ever sunk in the ground deeper than 2 ft. or 2 ft. 6 in. Pipes of 1½-in. diameter succeed them, and, more recently, 2-in. pipes have been almost universally adopted for the branch drains. There was also the horse-shoe pipe, laid on the tile as a sole; but these have totally failed and become obsolete. The adoption of 2-in. pipes, the area of which is 3·14 square inches, has been a great improvement, inasmuch as, besides being in nearly all cases large enough for the water to run out, they allow the air to pass up when they are not full, as before described, and thus ameliorate the condition of the soil above and around them. No single rule can apply as to size; but, as regards the sizes of main pipes, into which the minor pipes discharge, some attention is required to regulate them, and, if possible, their inclinations. In these cases, however, it would be impossible to fix the sizes by the ordinary rules of engineering; so that it is necessary to resort to experience, aided by a few approximations which serve somewhat as guides. These main pipes vary from 3 in. up to 12 in., and 2 ft. in diameter, in proportion to the area which will discharge into them, and the inclinations at which they are laid. The following table gives the approximate sizes of pipes for soils of maximum density [illegible] drained.

Square Inches.	Acres.	Acres.
7·66	6	4 to 5
12·56	9	6 ,, 7
19·50	16	13 ,, 14
28·08	25	20 ,, 22
38·22	35	30
49·92	46	40
63·18	60	50
78·00	75	60
94·38	91	70
112·38	109	80

The several degrees of porosity of soils between the extremes, must be treated as experience may dictate, and the inclination at which the drains are laid will affect the question: for instance, a rapid fall of the branch pipes into the main pipe would necessarily require that the latter should be increased in size; but a slow discharge does not require larger pipes than those given in the table.

Directions of Drains.—In ordinary-sized fields it is convenient, and in no way interferes with the efficiency of pipe-drainage, to lay out the minor drains in each field exclusively for that field, but to connect them with a main drain, which may be laid so as to take the water from several fields to a distant outlet. In uniform soils, whether dense or free, the usual practice is to lay drains parallel to each other, on what is commonly called the *gridiron system*. In stiff clays, where the drains are more frequent, this plan is undoubtedly to be preferred, for the reasons before stated,—that the water may be equally drawn off from all parts, and the land uniformly aërated. In free soils, such as gravel, sand, and the like, where there are springs which rise to the surface, and are visibly saturating large or small areas, the drains may be run in such directions as will enable them to tap those places, and ultimately to drain a larger area.

Deep as drainage may be laid, it is never altogether free from the possibility of being put out of order by the roots of trees or of certain kinds of crops which may penetrate the drains, and form a hindrance to the free passage of the water through them. The roots of the elm, ash, willow, and other trees are known to enter the pipes, and even pass through the ground for several yards to reach them, as if they were attracted by the moisture and air which they find in the pipes, and by the nourishment afforded them there. To obviate this difficulty, it is advisable, where it occurs or is apprehended, to use socket-pipes jointed with cement, or to lay the pipes as far as possible from the trees. I have found that embedding the pipes in lime, mortar, or concrete has prevented them from being choked, although close to trees which it was impossible to avoid, and has kept them clear for some years. The roots of some crops, such as wheat, turnips, carrots, mangold, &c., if they should penetrate the pipes, die away when the crops are removed, and are frequently washed out of the mouths of the drains by the strong flow of water through them. Other substances give the drainer a vast amount of trouble in obstructing pipes. Ochreous water, depositing oxide of iron, is a common source of obstruction. It appears to harden and consolidate as it receives air through the pipes, and ultimately chokes them. I have found it best to get at the source of the spring or springs, and conduct the water away by large pipes independent of the general system. Confervæ and parasitic plants will also get into the pipes, grow, and ultimately stop the flow of water through them. Another source of trouble is the percolation of sand into the pipes, which necessitates patience and care in taking them up, frequently after being first laid and relaid, until all the water has run out of the bed, and then laying them in straw and on strips of wood.

Fen-land draining is one of those exceptional cases where great skill and attention are required. In an instance with which I am acquainted, some fen pasture-land that was letting at from 2*l.* to 3*l.* an acre, was drained and broken up, but it produced scarcely any crops. It was too closely drained, and some time elapsed before it even partially recovered from the effects.

Mr. Clutton, in his paper on "The Cost of Conversion of Forest and Woodland into Cultivated Land," having alluded to the drainage which was carried out at Hainault and Shrob Walk, has drawn my attention to draining under those circumstances. I will just state that in the former case, although some pains were taken to grub up the roots of the oaks and hornbeams with the trees, we constantly met with them in the drains, and they were either taken out or [illegible] the light soils, in the southern part of the forest, were found deep in the ground.

At Shrob Walk, where the soil was almost entirely a uniformly stiff clay, we had not so much difficulty arising from this source, but in both cases the cost of draining was thereby increased, and this applies also to the land containing briars and underwood only. Could the draining have been delayed for a year or two, the roots would have nearly all rotted off.

Draining through rocky ground is very expensive, but, as in most rocks water either lies above the beds or below them, it frequently taps a large area of land, and where the rock projects out on the face of a sloping country, which it frequently does, it holds up the water in the land above it, so that one or two drains carried through it let free a large quantity of water, and the land will be permanently drained. The most obdurate rocks are those found in the high land of the old red sandstone, the lias, those of the coal measures, and others. This stone may be used for the farms or public roads, and this will very much relieve the expense of getting it out of the drains.

Cost.—The most material consideration resulting from all the experience of soils, depths, widths apart, inclinations, directions of drains, and sizes of pipes, is the minimum cost at which the work can be done, so as to obtain the best result in permanently improving the land. This must vary in different parts of the kingdom, according to the soil, the rate and quality of the labour for this kind of work, the seasons, and the price, quality, and cost of carriage of the pipes. Sometimes the cheapness of one or two of these items will counteract the dearness of the others, so that something like an average may be arrived at.

I have kept a register for some years past, which shows the rate of cost per acre and per rod of drainage works, executed under my supervision in localities distributed over a large part of the kingdom. This summary includes about 120 distinct works, representing every variety of soil and every degree of difficulty, ranging in quantity from 10 acres to 1,900 acres. The rates of cost extend from 3*l.* 6s. 8d. to 9*l.* 5s. 4d. per acre, and from 14 pence to 36 pence per rod, whilst the number of rods of drains to the acre varies from 39 to 115. The following are the results shown by this record up to the end of last season:—

Total Quantity Drained.	Total Number of Rods Cut.	Rods of Drains per Acre.	Total Cost.	Cost per Acre.	Cost per Rod.
A. R. P.	No.	No.	£. s. d.	£. s. d.	d.
15,006 2 16	1,136,219	75·7	90,284 12 10	6 0 4	19·70

It should be stated that these figures include the large and exceptional work of drainage of disafforested land at Hainault, the 1,900 acres of which cost upwards of 8*l.* per acre, and averaged about 105 rods of drains to the acre, the widths apart varying from 18 ft. to 60 ft. according to soil.

Where the rate per rod is high, the rate per acre may be low, and *vice versâ*. This necessarily arises from the nature of the soils, the prices of the pipes, and the widths of the drains apart, with other varying circumstances before referred to.

I have arranged the following table, which gives the general prices of work under the various conditions:—

Ordinary Cost of Cutting and Filling Minor Drains, using 2-in. Pipes at, say, 25s. per 1,000.

Depth.	Rate per Rod for Cutting and Filling.	Rate per Rod for Pipes.	Total.
	s. d.	s. d.	s. d.
4 feet	0 8	0 5	1 1
5 ,,	0 10	0 5	1 3
6 ,,	1 1	0 5	1 6

Cost of Main Pipes per Rod.

Size.	Price per 1,000.	Rate per Rod.
	£. s. d.	s. d.
3 in.	1 15 0	0 7
4 ,,	3 0 0	1 0
5 ,,	4 10 0	1 6
6 ,,	6 0 0	2 0
7 ,,	8 0 0	2 8
8 ,,	10 0 0	3 4

Cost per Acre of Cutting and Filling, including Pipes at various Depths, and [illegible] apart. [illegible] Distances.

Depth of Drains.	Distances apart.	Cost per Acre.
Feet.	Feet.	£. s. d.
4	16	8 18 9
,,	20	7 3 0
,,	24	5 19 2
,,	28	5 1 10
,,	32	4 9 4
,,	36	3 19 5
,,	40	3 11 6
,,	44	3 5 0
,,	48	2 19 7
5	30	5 10 0
,,	35	4 14 4
,,	40	4 2 6
,,	45	3 13 4
,,	50	3 6 3
,,	60	2 15 0
,,	65	2 11 3
6	42	4 14 6
,,	48	4 2 6
,,	54	3 13 6
,,	60	3 6 0
,,	66	3 0 0
,,	72	2 14 9
,,	78	2 11 0

To these rates should be added from 12s. to 15s. per acre for turfing, building up outlet heads, deepening and widening outfall drains, foreman's wages, superintendence, &c.

The cost of cutting through rock must always be exceptional, and no rule can be given for that kind of work.

Duration of Pipe Drainage.—Another question which deserves much consideration and attention is that of the duration of pipe drainage, and its continuously effective working. These properties depend almost entirely on the manufacture of the pipes, which are buried deep, and cannot be got at to be repaired without some expense, and which, when out of order, are

always liable to be neglected or repaired in an inefficient manner.

Where all the work has been well done, drainage executed thirty years ago is known to be in an efficient condition, although pipes were not then so deeply laid as they are now, and it may be fully expected that the deeper they are laid the less liable they will be to be injured or disturbed: a strong argument in favour of deep draining.

In conclusion, I have to make a few general observations on points which ought to be attended to in laying out and executing this kind of drainage, whether on a large or small scale. Like many other matters, drainage, when dealt with wholesale, can be done at less cost, and more efficiently. When an estate is to be drained, a comprehensive scheme should be at first determined upon, and taken in hand as a whole, whether the work is to be carried out all at once or to be extended over two or more seasons.

As to the manufacture of pipes—great variety exists in the cost, the localities in which they are manufactured, and in the quality. There is of late years a great improvement in the make of them. The cost in the yard, in different parts of the country, varies from 14s. to 25s. per 1,000, for 2-in. pipes, the 78 per cent. of difference partly arising from the quantity a manufacturer can make, owing to the facilities he has, and the nature of the clay, and partly from the price of fuel, or the amount of capital he can command. The carriage frequently very much increases the expense,—adding, in some cases, 50 per cent. to the first cost. The larger sized pipes increase in cost in greater ratio than the difference of the sizes, and the carriage also is greater in proportion, owing to increased thickness.

On an estate, where a large work is to be carried out, and where, probably, bricks are required for farm buildings and cottages, it is much more convenient to establish a pipe and brick yard upon it, provided proper clay can be procured, and a navigation or a railway affords the means of bringing coals.

Another important matter, upon which the successful result of pipe drainage mainly depends, is the superintendence. You want a man who not only can lay the pipes in a trench, but he must be of strict integrity, seeing that the trench is cut to fit the size of pipe, and with a proper fall, so that the waters shall always run clear away, and that every pipe is laid perfectly true in line, and so joined to its neighbour that neither loses any of its area by the ends not fitting truly and closely to each other. The foreman should watch closely that no bad (that is, unburnt) pipes are laid, as they will inevitably perish in time, and destroy the whole work. Men who are trained to the work become so skilled in laying out the direction of the drains that they can judge with tolerable accuracy the amount of fall in any distance, and the inclination at which the pipes should be laid. Of course in very flat countries the spirit-level must be brought to their assistance. The men who become the best skilled in digging the trenches make good wages; and I have always found that the workman who makes the best work earns the most money, and does the work most quickly. I would rather employ men who earn from 20s. to 23s. per week than those who can earn only 15s. or 16s.; but, of course, in a gang, all the men are not required for the most difficult and skilful part of the work. Farm bailiffs, who have other work to attend to, ought never to be employed to superintend drainage, as it requires the whole attention of the foreman to conduct the work cheaply and securely, and it is only men who are specially trained who can properly superintend it. There should not be larger bodies of men than from thirty to forty under one man's charge.

Another practice should be condemned by all who are interested in the success of these works, and that is that of giving pipes to tenants to lay themselves. Such work is never well done, and is just so much money thrown away.

All the drains ought to be laid down on the estate or other map so as to be referred to afterwards to find the outlets, and in case of extension to be able to add to the original work.

There is another matter connected with land drainage which must claim serious attention, and requires more than ordinary skill and judgment, i.e., under-draining land to be made into sewage farms. I drained Breton's farm at Romford, and after two years' working, it has answered well,—that is, the effluent water is, I believe, superior to that coming from any other sewage farm. It is in a porous soil, and so is that near Merthyr Tydvil, which was drained by Mr. Bailey Denton. We have not yet had sufficient experience of the best mode of treating such cases, especially in clay, loamy, or rocky lands.

I hope to be able to give the Institution some information hereafter on this branch of the subject.

A long discussion ensued, which was adjourned to the next meeting, Monday, January 15th.

EXPERIMENTS ON THE STRENGTH OF MATERIALS.

DOULTING FREESTONE.

THE result of some experiments on Doulting Freestone, from the quarries of Mr. C. Trask, have been made by Mr. Kirkaldy. It may be useful to record the results in our pages. The experiments were tried on eight beds and heights of stone to ascertain the resistance to a gradually increased thrusting stress, each stone being bedded against pieces of pine ¼ in. thick:—

Tested "against" the Bed.

6·04 × 6·05 = 36·54 super., height 6 in.—Cracked slightly with 75,240 lb., or 2,097 lb. per square inch. Crushed: 89,180 lb., or 2,441 lb. per square inch.

6·04 × 6·02 = 36·36 super., height 12 in.—Crushed: 79,620 lb., or 2,189 lb. per square inch.

6·03 × 6·02 = 36·30 super., height 18 in.—Crushed: 70,870 lb., or 1,952 lb. per square inch.

5·98 × 6·00 = 35·88 super., height 24 in.—Cracked slightly with 62,270 lb., or 1,735 lb. per square inch. Crushed: 65,890 lb., or 1,836 lb. per square inch.

Tested "on" the Bed.

5·98 × 6·00 = 35·88 super., height 6 in.—Crushed: 89,380 lb., or 2,490 lb. per square inch.

6·07 × 6·08 = 36·91 super., height 12 in.—Cracked slightly with 69,240 lb., or 1,876 lb. per square inch. Crushed: 83,620 lb., or 2,265 lb. per square inch.

6·08 × 6·04 = 36·72 super., height 18 in.—Cracked slightly with 72,770 lb., or 1,982 lb. per square inch. Crushed: 79,850 lb., or 2,174 lb. per square inch.

6·04 × 6·06 = 36·60 super., height 24 in.—Crushed: 77,040 lb., or 2,103 lb. per square inch.

SACRISTIES.

ST. GEREON'S CHURCH, COLOGNE.

ANY person who has compared the arrangement of our ancient English churches with the same class of building on the Continent must have noticed the fact that on the Continent the sacristy always forms an important feature, and is frequently of large size, in England it is nearly always a small (not to say mean) building, and in most of our churches does not exist at all. Now, there is considerable difficulty in accounting for this difference in ecclesiastical arrangement, because the varieties of rubrics and rite were not sufficient to explain such a discrepancy. Some have supposed that in England the sacristy was formed by portions of the church being screened off for that purpose, and probably this was the case in some of our village churches, where to this day the lower part of the tower is still used for that purpose, though of course this most inconvenient arrangement could not have existed in the larger and more important churches. It has also been suggested that the great length noticeable in the chancels of some of our churches is to be accounted for by the fact that the altar did not stand against the east wall, but was placed one bay from the east end, and the space behind it was used as a sacristy: and there is much to favour this supposition; for, in the first place, where ancient sacristies *do* exist in this country, they are very frequently found built out at the east end of the church; secondly, the general arrangement of the great reredoses in our cathedrals and abbey churches, with doorways on either side of the altar, would seem to suggest such position for the sacristy; and it is quite evident that at Meopham, in Kent, and Tideswell, in Derbyshire, the sacristy was formed in the eastern bay of the chancel, which was cut off by a stone reredos, marks of which still exist in both churches. Even, however, if this were the case, the sacristies so formed must have been exceedingly small. At first sight, this smallness of the sacristy would seem to point to great simplicity of rubric; but this is contradicted by the great size of the chancels in most of our churches, and their elaborate fittings, even if there were no historical evidence to prove that before the Reformation the English ritual was gorgeous in the extreme. Some people have asserted that in England, as a rule, the priest vested at the altar, and that the "parvise" was used for keeping the vestments, sacred vessels, &c.; but we can find no authority whatever for this assertion, and even supposing it to have been true that the *priest* vested at the altar, it is scarcely possible to conceive that his assistants did the same thing, or that the choir took off their cloaks and put on their cassocks and surplices in the chancel of the church. We confess that we are still at a loss to account for this peculiarity in English ecclesiology, and the suggestions which have from time to time been made upon the subject seem only to involve it in a deeper mystery.

Of the sacristies which do exist in this country, perhaps the most perfect are those of York Minster. However, even these are small and unpretending, and seem quite out of keeping with such an immense cathedral. The most beautiful buildings of this description existing in this country, are the sacristies of Wimborne Minster, Dorset, and Luton Church, Bedfordshire. The latter is a singularly beautiful example, and although rather small, is a costly building. It is vaulted with stone, and the roof supported upon a central column. Two sacristies exist at St. Peter's, Mancroft, Norwich, one above the other; both are at the east end, and occupy the usual position of the lady-chapel in large churches. Similar sacristies exist at the churches of Lavenham, St. Peter-per-Mountergate, Norwich, and Allhallows Church, Barking. The sacristy of the latter was rebuilt during the last century, but occupies the site of the ancient one. Good examples of ancient sacristies are to be seen at the churches at Margate, Rotherham, Hillesdon, and St. Mary, Oxford.

On the Continent, and especially in Germany and Italy, the sacristy is always an important feature. The example we give from the Church of St. Gereon, in Cologne, is a noble example, and is interesting from the fact of its containing a considerable amount of its ancient furniture; for instance, the altar, several aumbrys, the sink, &c. The rest of the furniture, though of the seventeenth century, is costly and handsome. The windows are filled with superb ancient glass, and, as will be seen from our engraving, the whole building is of a rich but very pure fourteenth-century style, singularly English in appearance, and quite free from that wiry character which is the defect of so many German buildings of this date. Undoubtedly the finest examples of sacristies of the Cathedral of Cologne are internally the most beautiful portion of the whole building, especially the outer sacristy, which consists of a square building, with a vaulting supported upon a slender and singularly graceful central column; the windows are of four lights. Against the east wall is an ancient altar with well-moulded "mensa" and base; and against the north wall is a most superb *sacraments häuslein*, a perfect forest of niches and pinnacles. The floor of this beautiful apartment is composed of small black and white tesserae arranged in patterns, and is a most valuable example of a fourteenth-century pavement.

The sacristy of the Cathedral of Freising is perhaps one of the noblest in existence. It is divided into a nave and aisles of equal width, five bays long, by two rows of octagonal columns of red marble. The whole is beautifully vaulted in stone. At the east end are the altars, over which are ancient pictures of great beauty. The whole building was originally decorated in colour, portions of which can still be seen.

The sacristy of the cathedral at Hildesheim is of a similar plan, only its axis is from north to south, and not from east to west. It is a plainer building, and not so large as that of Freising. It contains one altar dedicated to St. Thomas of Canterbury.

The sacristies of the cathedrals of Ratisbon, Freiburg-in-Breisgau, Aix-la-Chapelle, and Münster, are all interesting buildings; and those of the churches of Oberwesel (which contains its ancient altar and reredos); St. Mary's, Würzburg; Holy Cross, Schwabisch Gmund; and very many others, are excellent examples of the care which ancient German architects expended upon this portion of their ecclesiastical edifices.

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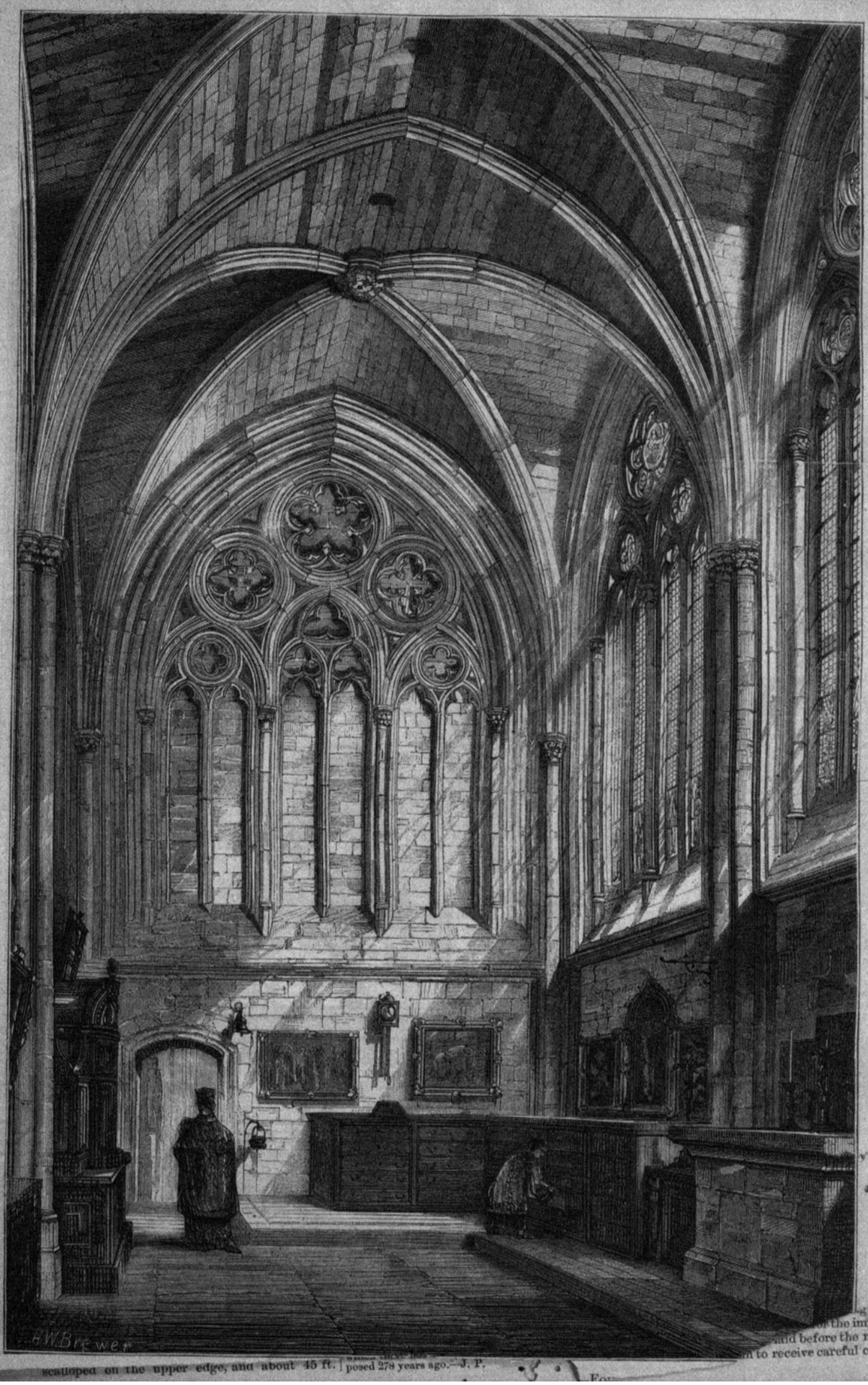


scalloped on the upper edge, and about 45 ft. | posed 278 years ago.—J. P.

CHURCH OF ST. JOHN THE BAPTIST, BATHWICK, BATH.

THIS is not an entirely new church. The original building, erected a few years since, consisted of a nave and chancel, with a transept, organ-chamber, and a small tower and spire, forming a porch at the north-west angle. The congregation having far outgrown the accommodation, an extensive enlargement became necessary. Mr. Blomfield was called in, and prepared a design for adding to it as much as the limited site would permit. The plan consisted of a large and lofty nave (the existing one becoming the north aisle), a south aisle and porch, a large organ transept, and priests' and choir vestries. This scheme had to be very considerably modified, and the south aisle abandoned, on account of the expense. The present plan has the same features, with the exception of the north aisle, but carried out in a plainer manner.

As there was considerable difficulty in adding a nave of satisfactory proportions in the usual way (owing to the limit of the site westward), the main roof is carried unbroken from east to west, only a sacrarium, 15 ft. deep, being cut off by a lofty arch at the east end. The choir is taken out of the nave area, and surrounded by a low stone septum and metal screen, and towards the west there is a stone rood-screen, which serves to divide the choir from the nave, and to receive the thrust of the old chancel arch. The division is further marked by a pair of coupled principals in the roof.

The roof over the choir and sacrarium is simply decorated in colour; and a considerable amount of stained glass, including the east window and the side windows in the chancel, has been presented by various donors. The reredos consists of a very effective mosaic picture of the Nativity, set under a richly-moulded arch, which forms part of the architectural design of the east end. This, as well as the decorative painting and the stained glass, was executed by Messrs. Bell & Almond. The altar and choir-stalls, in oak, were executed by Mr. Bates, of Stevenage, Herts. The carving was done by Mr. Earp, who also executed the pulpit. The metal-work is by Mr. Shrivell. The contractor was Mr. G. C. Mann, of Bathwick. The organ, which is a fine instrument, though yet unfinished, is an electric one, by Messrs. Bryceson, the organist sitting behind the choir-stalls on the opposite side to the organ.

The general dimensions of the building are:—Nave and choir, 96 ft. 6 in. long, 29 ft. 6 in. wide, 35 ft. high to plate, 60 ft. to ridge; sacrarium, 15 ft. long, 21 ft. wide.

The total cost was under 5,000*l*.

CHURCH DECORATION AT WEYMOUTH.

THE parish church of St. Mary's, Melcombe Regis, which is a structure devoid of the marked features of ecclesiastical architecture, has this year received a Christmas decoration deserving of a passing notice. The church, which furnishes some 2,000 sittings, is an elongated square, with galleries on the north-west and south sides—the gallery front being continuous, and divided by plain stone columns into spaces of about 12 ft. each. The entire sweep of the gallery front is covered with a series of needlework designs, in which the utterance of the shepherds, "Glory to God in the highest, on earth peace, goodwill toward men," is shown by church-text characters of about 13 in. each. The letters are formed principally of laurel-leaves and scarlet cloth on a white ground. The word "God," which occupies one of the gallery openings, is rendered by letters of white swan's-down on scalloped squares of scarlet cloth, the terminals of this design, as well as that of some others, being diapered with strips of scarlet cloth fastened at the points of intersection with rossettes of ivy leaves and swan's-down. The other principal words are composed of scarlet cloth, some with trimmings of swan's-down, each design having a border at top and bottom formed of single laurel-leaves, relieved in each half-lozenge by diamond-shaped pieces of scarlet cloth and wool, and forming a continuous zigzag pattern throughout the sweep. The gallery spaces on the east end have each the word "Alleiulia," shown in white letters on a scarlet ground, with ornamental trimmings. On the eastern wall is a large painting about 30 ft. square, besides being at the top of an elliptical shape, following the line of the ceiling. Fitted to the upper sweep of the frame, a roll, scalloped on the upper edge, and about 45 ft. long, exhibits the text, "A Saviour which is Christ the Lord," in white, on a ground of scarlet cloth. The letters, which are decorated with ivy-leaves and yew, form a continuous scroll. The credit of the design is due to Mr. G. R. Crickmay, architect, who is this year one of the churchwardens of St. Mary's parish, and it has been carried out by a small body of honorary needlewomen, who have shown precision and taste in the execution of the work.

ON THE PREVENTION OF NOXIOUS SEWAGE EMANATIONS.

THE writer of the article with the above heading, in last week's *Builder*, advocates what is no other than a mischievous fallacy. He says that "there is no smell from self-cleansing channels; . . . . that the only need of traps and ventilators is to guard against accidental stoppages;" and that, "as a rule, where there is smell from the drains or the sewers there is stagnant deposit." Now, it is a fact that "good tubular sewers or drains . . . . so constructed . . . . as to be self-cleansing, and to be always clear of deposit," give out noxious emanations the same as sewers and drains of deposit. The writer seems to think that, as "fresh human excreta is innocuous," and that as "the period of noxious decomposition begins usually not later than about four days in the sewer-tank," it is removed in self-cleansing sewers before decomposition takes place and foul gases are evolved from it. But this is not the case. Those who have taken particular notice of sewage flowing in sewers will tell him that little or no excreta is ever seen towards the outer end, and not even in those from separate streets. The water, and its motion or agitation in the sewers, quickly dissolve the excreta, whose gaseous constituents then enter into chemical combination with the water; then, the mass being foul, and warmer than the air which occupies the large rainfall space above it, the agitation of it by the flow, together with its warmth, and exposure to the less temperature of the overlying air, causes it at once to emit noxious gases. There is an old saying, that "the more you stir a certain compound the worse it smells." It is even so by the motion of the sewage through the sewers. The writer's fallacies, such as the above, and his theoretical interferences with the practical details of the necessary works, have retarded, and will, I fear, continue to retard, sanitary progress.

The lightest and most abundant of the gases which emanate from the sewage—namely, sulphuretted hydrogen,—flows up the drains to the highest points under the water-traps to the sinks and closets, through which it escapes, not only every time water is discharged down them, but when the pressure of the pent-up gases on the outlet sides of the traps is greater than the pressure of the external air on their inlet sides. The above, then, is what naturally takes place in every sewage-channel, whether it be self-cleansing or of deposit; and hence the necessity to "make a vent therefrom upwarde . . . . and carrie the same to a convenient heighth; for so the offensive ayre as fast as it riseth hath issue, and stayeth not in the passage."*

The writer says truly that "the most effectual course is not to combat with the gases when produced, but to prevent their production." No one has ever prevented their production in self-cleansing channels, and cannot do so. "Good tubular sewers or drains . . . . so constructed . . . . as to be self-cleansing, and to be always clear of deposit," are as much "the bulbs of retorts, and the house-drains as the necks, conveying the" gases evolved from the flowing sewage "into the houses," as are the sewers and drains of deposit. The "bulbs," in fact, are in both the large air-spaces which are provided for the rainfall above the sewage. The nearest approach to the desideratum of preventing the production of the gases would be to reduce the capacity of the "bulbs" to a minimum,—that is, to make the sizes of the sewage channels proportionate to the maximum flow of the sewage. By doing this, noxious emanations from the sewage would be greatly reduced, or almost prevented. But this would involve the adoption of the "separate system of drainage," which consists in carrying off the sewage by one set of drains, and the rainfall by another set. This system, after every other has been blundered through, will be adopted. Complete ventilation of the main drains could be effected by revolving fans placed in them at suitable situations, and *driven by the force of the sewage currents*. The noxious gases as they emanate from the sewage would be drawn into and driven up the ventilating pipes, which would be connected with the fans, and carried above the altitude of the houses.

JOHN PHILLIPS.

* "How to Take Away the Offence of Noisome Vaults."—"Make the vent thereof upwarde as large or larger than the tunnell downward, and carrie the same up to a convenient heighth, for so the offensive ayre as it riseth hath issue and stayeth not in the passage."—*Sir Hugh Platt, "The Jewell House of Art and Nature,* 1594." Thus was drain-ventilation, about which there has lately been much clamour, publicly proposed 278 years ago.—J. P.

NOTES FROM AMERICA.

I MUST preface my letter with a description of railway travelling in America, and confess that Great Britain is a long way behind the times. 1st. In regard to luggage. When a traveller arrives at a depôt, his luggage is taken from him, a brass ticket given him, and a corresponding ticket attached to his luggage, the station marked on the same: so, when at the end of his journey, he hands the ticket, and receives his luggage. Again, the cars (all railway-carriages are called cars) are far more convenient: a smoking-car, palace-car (fitted up boudoir fashion), and sleeping-cars, to each; there are a filter for drinking-water, and closets for males and females.

The New York State (about the size of England) is well intersected with railways. Some of the cities are really very pretty,—streets laid out with avenues of trees, in summer having a very pleasing effect, besides acting as a shade from the sun. There are several very fine cities, Albany being the seat of the State Legislature; and the House of Assembly, if built according to the drawings of the architect, will be a very imposing affair; but it seems to your correspondent, that if the cities would patronise bricks, instead of timber and limestone, there would be fewer fires, and the buildings erected would be of a more substantial character. New York city, in the writer's opinion, is a long way from a Paris, and never will approach London. The Central Park is a very beautiful place, with good skating-ponds, and fine walks; but there is a great deal too much "shoddy" in the "*turn-outs*," and one can see at a glance, like mock jewelry, it is very good for display, but, after all, not the genuine article.

Just now the municipal powers in New York are likely to be comfortably provided for in the State prisons, for merely robbing the City Treasury of a few millions of dollars. Could the writer but have had the privilege of surveying or estimating for the repairs of broken windows, he would have had now a "*splendid stone front*" *in the 5th Avenue.*

QUERCUS.

TURNERS AND WOOD TURNING.

HAVING seen a letter in your issue of December 16th upon "Wood Turners and Wood Turning," I hope you will favour me by publishing a few words upon the subject. "Wood Turner" thinks with Mr. Olley that if a man can produce two specimens from an architectural drawing, he must be a good workman. I must differ from them, as a good turner is expected not only to work from architects' drawings, but to do a hundred and one things that an architect would not think of; and allow me to say that as a rule (at the West end of London, and I dare say it is the same at the East end), when turners work from a drawing, if it is so ordered, they copy it exactly. As for what a turner can earn, I know men who consider themselves first-rate workmen, who, if they were paid full prices for their work, would never earn even moderate wages. Your correspondent wishes turners would combine to produce good work, and stand out for fair wages. There is now a society in existence for these purposes; but although it is flourishing, it has not received the support it deserves from the trade; and if "Wood Turner" be a journeyman, I hope he will add practice to precept, and join the society, and give the members the benefit of his twenty years' experience; and if he be a master, if he will address a letter to me showing what course the society ought to follow for the improvement of the trade, it shall be laid before the members, and it will be certain to receive careful consideration.

It is a pity so many apprentices are taken by men who do not know how to teach them their trade, but there are masters who do employ journeymen, and take apprentices, who are incompetent in every sense of the word. There is one who considers himself the first turner in London, and works from architects' drawings: he has had several apprentices, and his foreman says that he never turned one of them out as a first-rate workman. As for inferior workmen being obliged to become masters and ruining the trade, the masters have in a great measure themselves to thank for it, on account of the many inconveniences they put their men to, such as working in dark and badly ventilated workshops, having inferior lathes and tools, and in some instances keeping them waiting for their money. I have had to wait for two hours, and then go away short of half my earnings, and when I began my work on Monday morning, found my employer was in the country recruiting his health (with my money). Such things as these make careless workmen, and often drive men to the public-house, when they are waiting about on Saturday for their money. There are many first-rate workmen who have started in business for these and similar reasons. I shall address another letter to you more fully upon this subject, and likewise upon the late competition for the freedom of the Turners' Company.

W. A. BARBER, Secretary,
The Society of Journeymen Wood Turners in General, Southampton Arms, 350, Euston-road, N.W.

"A REVIVER FOR SOUTHAMPTON."

SIR,—Observing a letter under the above heading in your issue for December 23, 1871, signed by one who describes himself as knowing the district well, and as having given close observation to the subject, permit me, as secretary to the South Midland Railway Company, to express my surprise that your correspondent should state the saving in distance between South Wales and London, by the proposed tunnel, at twenty-four miles, when the promoters only set it forth at sixteen miles.

The ease with which he makes companies with antagonistic interests work over each other's lines, and allow through rates at low charges, at the same time getting over difficulties on paper which have proved insurmountable in practice, is simply amusing.

Is he aware that the line from Southampton to Salisbury is South-Western; from Salisbury to Bath and Pilning Great Western, more than half of this being but a single line, and therefore incapable of accommodating the traffic of this port, extremely circuitous, and with bad gradients against the load?

Does he remember that the totally neglected country traversed by the South Midland is as fully entitled to consideration as regards railway facilities as its terminus, and that no comparison can be drawn between Mr. Fowler's high-level and costly bridge and that proposed at Sharpness, since Admiralty regulations can present no difficulties, the fact being that high-masted vessels do not go higher up the river than the entrance to the canal?

If your correspondent be interested against us, let him remember he will do his own case no good by misstating ours.

J. E. LE FEUVRE, Secretary.

*** With this the correspondence may end.

KENSINGTON ROAD AND HYDE PARK.

THIS main arterial thoroughfare, in its extent from Regent-circus westward to Kensington for a distance of two miles and a quarter, may be termed the grand Boulevard of London; the corresponding Bayswater-road on the north side, extending for a mile and a half along the Park border, being somewhat inferior in width of roadway, but having the advantage of more important buildings along its line.

The abatement of the old Park boundary brick walls, and the substitution of a handsome iron railing, have altogether changed the character of both these thoroughfares, and at the same time have given an apparent extension to the grounds and plantations within the *enceinte*. In the Bayswater line no paltry ranges of mean shops border the road, nor sever the continuous sylvan view; because on this line successive ranges of noble terraces have been erected within the last forty years, which, from their happy position, fetch double the rental of equivalent structures in other parts of the town.

On the Kensington route it is far otherwise: the most valuable portion of the Park border, extending from Albert-terrace, Knightsbridge, to near Rutland-gate, for the length of half a mile, is curtained off by ranges of paltry old shops, and by the still greater blot (so far as the frequenters of recreative grounds are concerned) of the antiquated cavalry barracks of Knightsbridge. The backs of the old houses have been judiciously planted out by landscape gardening, trees, and shrubs; but the barracks advance 30 ft. upon the Park drive, exhibiting windows and troopers, in dress and undress, to the extent of 450 yards!

The principal object for improvement is, however, not the Park border, but the grand Western Boulevard. From Kensington the road is sufficiently wide, and nearly direct, until approaching Prince's-gate, the Park side footway is gradually widened from 10 ft. to 20 ft.; the railing preserving its lineal direction as far as the west side of the gateway; when on the east side the fence is protruded 18 ft. at a sharp angle upon the causeway, the south slope continuing onwards to the barracks; so that this building cuts off the view of nearly the entire width of the causeway, thus marring the line of route in this its most valuable portion. Here Princes-terrace, Ennismore-place, Rutland-terrace, and the adjacent highly-improving quarters are choked in, and muffled up by unsightly shops and public-houses; as the barrack is an insuperable obstacle to all improvement, even in this position, which would otherwise command a *tenfold rental*.

There are other sites such as the Chelsea Guards' Barracks, which would be much more suitable to the Horse Guards, and even nearer to Buckingham Palace and the Houses of Parliament. The plot occupied by the barracks measures in length 400 yards by a mean width of 60 yards; and on the road line of this plot, at least 20 ft. might be thrown out into the road, to enlarge the causeway, and open a continuous view as far as the junction with the Brompton-road. Upon this site a range of Park-side mansions might be built for a length of 300 yards, leaving a marginal plot of 30 ft. in width on both the Park and road frontages, giving at least 3,000*l.* a year in ground-rents, so as in some measure to defray the expense of improved quarters for the troops, and at the same time to realise incalculable advantages for this the best quarter of fashion, which has been so long under the ban of squalor and depression.

In completing the allineation and opening of the Boulevard to Albert-gate, there is, however, a range of nine paltry shops which should be cleared away, so as to open out the vista from the range of Albert-terrace on the east end, and the stables of his Grace the Duke of Wellington, occupying an area of 180 ft. by 90 ft., might possibly spare 20 ft. in depth along the Knightsbridge-road frontage for the public accommodation, and for the realisation of so grand a metropolitan improvement. These stables cover every foot of the large area, extending from the line of Park-wall in the rear, to the Knightsbridge footway in front, advancing on the latter 40 ft. farther than the barrack façade.

As viewed from Hyde Park corner, just opposite Apsley House, from which the inner Park Drive and the Fair Mile Ride branch off, this southern border reach of Park presents a charming prospect. The borders are laid out in the most perfect style of landscape gardening: shrubs, fine forest trees, and flowers adorn its whole extent, as far as the Serpentine head and falls. But walk along it. For about 500 yards an appropriate iron railing fences it off from the main Piccadilly route; and then a narrow wedge of paltry and antiquated shops clings on to the old Park wall, as far as a modern chapel, with two public-houses as supporters, one on each hand; a pawnbroker; and lastly, the residence of the French ambassador, a handsome structure, at Albert-gate. In continuation, two fine houses follow on the opposite gate piers, and then there are five or six warehouses and workshops, built right up to the Park wall; after which the gardens of Albert-terrace open out, and redeem the stigma of huddled, shapeless, and crazy tenements. Next comes up to the wall the less offensive range of six houses in Park-place, and then, of course, a public-house; lastly, the barrack boldly intruding its unsightly red brick elevation, still unblushingly advances 30 ft. *upon the Park drives*. Well, what is the consequence? Why, the Park fashionable drive ends here, and a quadruple line of equipages during the season *stops short of it*, returns, and circulates within a range of a quarter of a mile!

A great portion of the tumble-down houses in the line belong to the Dean and Chapter of Westminster; and if we look to their possessions in courts, lanes, and the vile slums near the Abbey, there is small hope of improvement through their mediation. But this is a great and vital public question for some Governmental authority, or for the Board of Works. All the public parks have been wondrously improved of late, and the benefits derived from them by an increased and cumulatively growing population fully attest their value—no plant is disturbed, no flower plucked—and this shows their gratitude.

The parochial authorities of Kensington have of late widened the main street opposite to their new church now in progress; their co-operation in rectifying the grand Piccadilly boulevard would insure its completion. The extension and enlargement of great thoroughfares already undertaken by the Board of Works will no doubt prove highly beneficial to commerce, and to the inhabitants generally; but the improvement and widening of our old-established lines of intercourse, and the removal of blots that are odious in the eyes of foreign visitors would not only relieve our metropolis of discredit, but aid in elevating it to the rank it ought to hold, as being at the same time the wealthiest and the most beautiful in Europe.

QUONDAM.

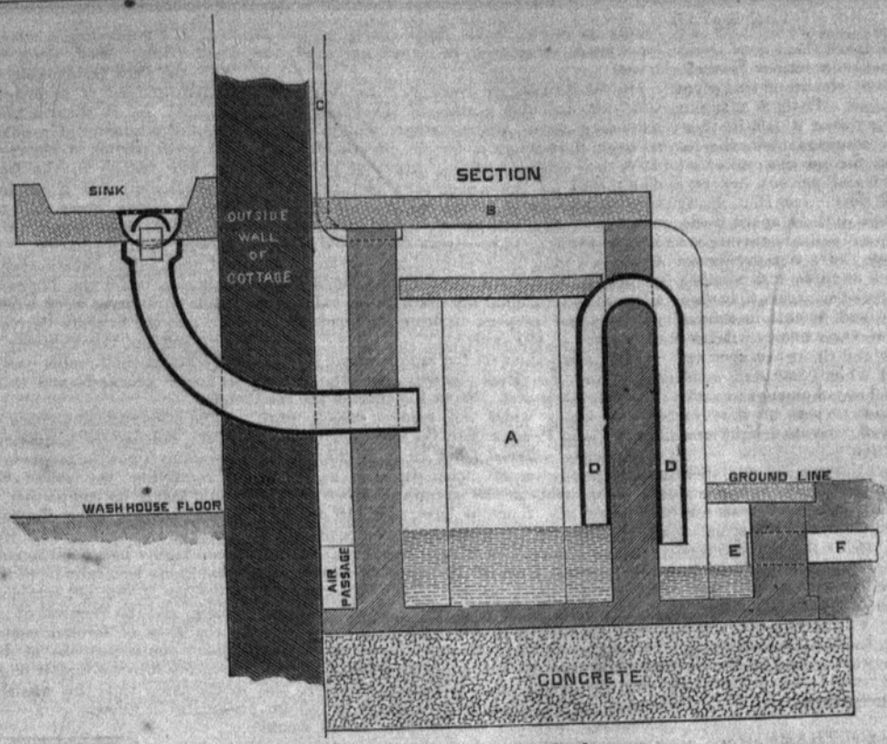
THE WOODEN STAIRS IN THE COURT THEATRE.

IN reply to a letter from "Y" in a recent number stating that "there is a flight of stairs made of wood, leading from the street down to the pit of the Royal Court Theatre, Chelsea," Mr. W. Emden, as the architect of the theatre, writes:—"The pit steps are of stone, surrounded and entirely supported by brick walls, with a stone landing at head and foot; and the same can be said of all the other public stairs in the building. 'Y's' letter appears to have been written under a misapprehension arising from a cause which I proceed to explain. After the Court Theatre had been opened to the public the landing at the head of the pit stairs was enlarged, and to meet this enlargement the stone steps from pit to street (about seven in all) were cased with wood. This casing is completely cut off from the general woodwork of the theatre, and even though the building were burnt to the ground, yet would the stone steps from pit to street, with their wood casing, remain intact, or nearly so: that they would continue to afford safe egress during the most violent conflagration must be at once apparent from my explanation."

This reply does not remove the objection raised. A landing having been formed at the top, as stated, the wooden flight of stairs is, of course, in advance of the stone steps, said to exist, to the extent of the width of the landing. The Building Act demands that stairs in theatres shall be of stone, or other fireproof material, and those down to the pit here are not so. "Y," therefore, is quite correct in objecting to them, and did not write under any misapprehension.

MONUMENT TO THE LATE BISHOP LONSDALE, LICHFIELD.

THE monument which has been erected in Lichfield Cathedral to the memory of Bishop Lonsdale, who, after an episcopate of twenty-four years, died in October, 1867, has been publicly unveiled. The memorial, which is a fine work of art, stands underneath the arch on the north side of the sacrarium. It consists of base, recumbent effigy, and canopy, with three elevations and pinnacles. In the base, which is composed of layers of green marble of various shades, and of alabaster, there are medallions in alabaster, with carved shields containing the late bishop's crest and symbolical representations. Around the upper edge of the base is engraved the following inscription:—"John Lonsdale, D.D., Bishop of Lichfield, born January 17, A.D. 1788; deceased October 19, A.D. 1867. Erected by the diocese in memory of his eminent learning and piety, his unwearied labours, and paternal care, during an episcopate of twenty-four years." On the massive base



Self-Acting Syphon Sewage Tank.

there is a recumbent figure of the bishop, in full canonicals, with pastoral staff at the side, mitre on the head, the hands raised as in supplication, and the feet resting against the typical dragon. This figure is in alabaster. From the base rise four pillars of green marble, surmounted by foliated capitals. These, with four flying buttresses in yellow Mansfield stone, support the canopy, from which rise three richly-carved hoods and a number of pinnacles. The canopy is in Painswick stone. The hoods are surmounted with figures of angels, in alabaster. The whole is rich in carving.

The monument, which has cost 2,000*l.*, was designed by Mr. Gilbert Scott. The work, with the exception of the recumbent effigy, which was executed by Mr. Watts, the painter, was carried out by Messrs. Farmer & Brindley, Westminster. Some who remember the mild face of the late bishop seem to think that the expression on the features in the effigy is a little too harsh, though the likeness is good.

SOANE'S MONUMENT.

SIR,—I have read with much interest the correspondence in the *Builder* between a "Soane Student" and a "Lover of Truth," and can confirm the statements of both correspondents, for at the beginning of last year the tomb of Sir John Soane was in the deplorable condition described; it has, however, since been repaired under the inspection of Professor Donaldson and myself, at the expense of the immediate descendants of Sir John. This is the second time within the last nine years that the monument has been repaired at great cost, but we have no means of securing it from future wanton injury. The trustees of the Soane Museum in 1870 opened a correspondence with the parochial authorities of St. Giles-in-the-Fields, who repudiated their liability, and suggested the removal of the monument to the Soane Museum!

I entirely concur with your correspondents on the disgraceful neglect of our closed cemeteries. Why should there not be a legally-qualified Board to supervise and protect these cemeteries, many of which contain the remains and monuments of by-gone worthies? In some rare instances they have been planted and rendered pleasant places of resort—small breathing-places in our crowded metropolis. The cemetery of St. Giles-in-the-Fields ought to be an especial place of pilgrimage for the lovers of English art, containing as it does the remains of our great sculptor, Flaxman, and of Soane.

JOSEPH BONOMI.

Soane Museum.

SELF-ACTING SYPHON SEWAGE TANK.

SIR,—A short account of this apparatus, which has now been for several years in successful action at some cottages of mine in Essex, may be of interest.

I may premise that when the cottages came into my possession the sewerage arrangements consisted of privies of ordinary construction for the excreta, and simple holes in the ground near the scullery for the house-slops; these holes, as well as the privy cesspool, being emptied at intervals, and the contents spread on the gardens. The privies were readily converted into earth-closets by reducing the cesspool in size, rendering it water-tight, and providing buckets and scoops for the earth; but at first the tenants would not use any earth at all, and, eventually, all they could be induced to do was to throw down earth occasionally, and that in quantities quite insufficient to absorb the moisture of the excreta and urine slops. The objection of the tenants to the use of the earth arose not merely from the trouble involved, but from a notion that it spoilt the contents of the cesspool as manure. Perfectly as the dry-earth system effects the innocuous disposal of the excreta, with proper care, my experience convinces me that nothing short of almost daily superintendence will secure this care in the present state of ignorance and indifference of agricultural labourers, even of the better class.

The question of how to dispose of the sink and scullery slops was more troublesome. There was no drain they could be run into without causing a nuisance; and how were they to be applied to the land in any way that should be self-acting? Ordinary surface irrigation would require too much attention; and sub-irrigation, by underground pipes, though more promising, was open to the great objection that the small amount of sewage would not be able to force itself any distance along the pipes, but would lie in one place, and gradually choke them. To overcome this difficulty, I devised the Self-Acting Syphon Sewage Tank. The accompanying sketch shows the tank as it has been actually in action for the last three years. The sink is connected by a trapped iron pipe, with a small water-tight tank (A), covered with a movable stone cover (B), and provided with a ventilating pipe (C), which is carried up the outside of the cottage. The outlet from this tank consists of a syphon pipe (D), so arranged that it will not discharge any sewage till the liquid in the tank rises above the top of the syphon, when it at once becomes charged, and empties the tank very rapidly. As soon as the sewage is lowered to the level of the bottom of the syphon (which is a short distance above the bottom of the tank, so as to leave a space for the deposit to be cleared out periodically), the syphon is thrown out of action, and allows the tank gradually to fill again with sewage. The syphon discharges through a small well (E) into a drain (F) leading to the sub-irrigation drains, which latter consist of common 2-in. agricultural drain-pipes laid about 12 in. below the surface of the cottage gardens. The sewage flows out of the joints of the pipes, fertilising the soil, and purifying itself.

The syphon arrangement has these two important advantages,—first, that the concentration of the flow of the sewage, effected by discharging the collected supply of several days in a few minutes, forces the liquid a considerable distance along the sub-irrigation pipes, and prevents their being choked; and, second, that the intermittent action of the syphon gives full opportunity for the soil to purify the sewage, on the principle of "intermittent downward filtration." Of course, unless the land itself is naturally porous and dry, it must be under-drained, with special precautions: otherwise, the sewage will penetrate direct into the drains, without sufficient passage through the soil to purify it. I experienced this difficulty from the garden (the subsoil of which was mild clay) having been previously drained without any reference to its being irrigated; but, notwithstanding this drawback, the sewage was, under ordinary circumstances, entirely absorbed by the soil.

The sub-irrigation pipes were intended to be taken up and cleaned annually, and provision was made for readily doing this, by laying them on a continuous bed, formed by dividing larger pipes longitudinally into two equal parts; but it was actually found unnecessary to disturb them for nearly three years. A strainer has recently been introduced to intercept the solid matter from the syphon, which will, no doubt, render the action of the pipes still more satisfactory; and I am al making arrangements for having the whole apparatus constructed complete in iron, with various improvements, which will, I believe, render it cheaper, more efficient, and portable. Though designed for cottages, the apparatus is evidently applicable to any house where a dry system of disposing of excreta is used, and where there is a garden or other land below the level of the house to which the liquid sewage may be advantageously applied by sub-irrigation.

ROGERS FIELD, C.E.

THE OLD MASTERS AT THE ROYAL ACADEMY.

FEW things would give a better idea of the latent and wide-spread wealth of this country, even in objects of fine art, than a summary account of the 270 pictures which, in this the third year of this self-imposed task, the Royal Academy have collected from the galleries and apartments of public and private owners, and hung on the walls of Burlington House. True, there is room enough and to spare,—vacant saloons and single rows of paintings in one or two that are not vacant. True, the gathering of 1872 falls far short in number, and possibly in interest, of its predecessors. True, that there is much now exhibited which, even if it originally illustrated the art of the great names it boasts, or gave unmingled pleasure to the spectators, can be said to do so no longer. But, with all these admissions, there is yet enough to make a morning spent in the rooms of the Royal Academy an occasion of extreme delight as well as of valuable instruction.

The main feature of the present exhibition is a large number, comparatively speaking, of admirable portraits, by the first masters of picture portraiture that the world has seen. An opportunity is given, not to the student alone, but to the skilled artist, and the ripe critic, for improving his taste by the comparison of noble works of Vandyck, Titian, Gainsborough, Rembrandt, Rubens, Velasquez, Sir Joshua Reynolds, Romney, and other painters.

As an instance of the rare educational value of the exhibition, we may refer to a most valuable set of studies, by Vandyck, which have been lent by the Duke of Buccleugh. It is, however, a doubt whether these monochromes are not sketches, of course by Vandyck, made for the engraver. Among these there is one of the Infanta Isabella Clara Eugenia, the Vice-Queen of the Low Countries, whose name is so familiar to the student of the time of the Emperor Charles V. She is represented, not in a widow's dress, as stated in the catalogue, but in that of a religious order, with her rosary by her side. The little panel on which this sketch is made, is, like the rest of this important series, some 9 in. by 7 in. The whole character of the Infanta has been grasped by the genius of the painter, and firmly, yet delicately given in the sketch. There is the heavy Austrian chin (the inheritance, together with the Tyrol, of Pouch-mouthed Meg), treated with grace, but without weakening the force of the feature. There is the eagle glance and the commanding brow and nose of one born in the purple. Now the Earl of Hopetoun has sent the full-sized painting of which this small panel contains the study. It is a magnificent picture, 55 in. by 44 in., in admirable preservation; and yet, grand as the picture is, it hardly renders the countenance with the vigour of the sketch. The juxta-position of these two historic treasures is extremely interesting.

It is not the fault of the Academy that Rembrandt had two mothers,—or at least that we are presented with the portraits of two very different old ladies under this title. One of them, No. 68, the property of the Earl of Hopetoun, is a *replica* of the well-known No. 775 of the National Gallery, the bust being (if memory is reliable) a little more full-faced in the Earl's copy than in that belonging to the nation. The latter is inscribed, "Æ. S. I. E. (*Anno Ætatis Suæ*) 83," and dated 1634. It was formerly in the Erard collection, and has not been identified by the careful compiler of the catalogue of the National Gallery with any known subject. The second portrait at Burlington House is numbered 179, and belongs to the Duke of Buccleugh. It is a very different countenance from that of the old lady in the ruff. Attired in the dress of a nun, with a thoroughly Rembrandtesque gloom thrown by the hood, and relieved by the white pinners, this noble old dame is reading a ponderous volume. Her features approach nearer to the regal curves of the Infanta Donna Clara than to the somewhat bunchy outline of the other portrait. But what is very remarkable is, that although there is no resemblance that can be traced between the modelling, or the technical drawing, of this fine countenance and of that of the painter himself (of whom a portrait, also belonging to his Grace of Buccleugh, and numbered 181, hangs near, very closely resembling No. 221 in the National Gallery), one may well imagine that there is a likeness. Nothing is so subtle as family likeness. In the present instance, the similarity of outline is between the old lady in a ruff and the painter; but a deeper sympathy seems to lie between his genius and the face of the noble woman.

Foremost amongst the most interesting features of the Exhibition is the Raffaelle lent by his Royal Highness the Duc d'Aumale, No. 95 in the catalogue. This brilliant little Virgin and Infant is an undoubted work of the great master whose name it claims. It is on panel, 18½ in. by 11 in. It is in very good order, and judiciously framed, lighting up the whole side of the apartment with its red and blue drapery. The features of the Infant are on the same type as those of the Aldobrandini Madonna, which, however, it by no means rivals in beauty. But the loving, half-wondering expression of the mother's face is almost unrivalled among the Virgins of Raffaelle. It is the expression, not the painting, that is so admirable; and the treatment of the hair of the child is—as far as memory serves—unique. Little rays and glints of glory spring out from the tiny hairlets; and although the conventional nimbus is indicated, both around Mother and Child, the self-luminous tints of the latter are wonderfully imaginative and divine.

Probably of more actual value than the solitary Raffaelle are two paintings by Leonardo da Vinci,—the most cultured and learned, if not in all respects the first, of the great Italian masters. One of these is a Madonna belonging to the Duke of Buccleuch (117), on panel 18½ in. by 14 in. A curious injury has occurred to the forehead—on which a raised curved line suggests the idea that the upper part of the head has been restored. It is, however, most probably, an evidence of the barbarous piety that imagines that it adorns pictures of saints by attaching crowns of silver or of gold to the canvas. The complexion of the Virgin is of the lovely olive brown so often to be seen in the works of this master. The hair falls in crisp, almost wiry curls; the face of the Infant, who is contemplating a little cross, is almost sentimental. But the motive of the picture is that very Cross. As the child regards the symbol, so does the mother regard her child. The composition is, of course, masterly; the face of the Madonna, especially the mouth with its shadowy outline, exquisite. The large-sized hand must have been painted from the real model of the painter. The greenish blue of the background, where sea fades into sky, has suffered more than the rest of the picture. This painting is one of the highest value and interest.

The second Leonardo is the portrait of a young man, on panel, 21 in. by 14 in., the property of Mr. W. Fuller Maitland. It would be difficult to point out a picture so limited in size and in subject which more fully illustrates the genius of an unsurpassed artist; and yet it is one which a person might be pardoned for passing, if he only saw it closely, without remark. Full of cracks in the paint, faded in the colouring, with the modelling of the right hand so much obliterated that the outline appears to be out of drawing, a close inspection shows more traces of the ravages of time than of the magic of art. But stand at that distance at which Leonardo, in his *trattato di pittura*, defined that a picture should be seen, or a little further off, and the form becomes instinct with life, the hand resumes mobility and beauty, and the face looks forth with a noble individuality that dwells long on the memory. The figure holds a scroll on which is written, in Lombard hand, the date 1494, the words ANO 20, and the monogram M. R. The portrait has rare value.

Correggio is unrepresented in the exhibition. We may say the same of Titian; none of the four paintings attributed to that prince of portrait-painters bearing any visible marks of so illustrious a pedigree. Titian, indeed, may be said to be nobly represented at second-hand; for Hilton's "Ganymede," the property of the Royal Academy, has been evidently inspired by the "Ganymede" of Titian in the National Gallery. In fact, the first impression was, "how much better lighted the picture is here than in the Gallery!" The treatment, however, is different. The noble head and mighty plumage of the royal bird, his soar across the field of vision, the charming face and eager heavenward look of the boy, the tender grasp of the eagle, which holds the quiver of the "Ganymede" rather than his flesh,—all these are elements of a very fine picture. The attitude of the bird is questionable; so it is with the eagle of Titian.

Other Italian masters in respectable numbers are more or less worthily represented by one or more pictures. Of Giorgione there is the "Temperance" belonging to the Royal Academy, famous for its glorious hair, but with a lip betokening anything but temperance in passion. Of Guido Reni there is one of the stock figures, women with up-turned eyes and wounds of body or of mind—Cleopatras, Magdalenes, or what not. This one is called Saint Agatha. The right hand is beautifully drawn. The countenance is palid with the pallor of death. There is a fine study of two figures by Andrea Mantegna, lent by the Duke of Buccleuch. Three Tintorettos are harsh and grim. In one of them, a very ill-composed family picture, the first person of the Trinity is introduced in a most inconceivable fashion. Sir Coutts Lindsay sends three portraits, entitled those of "the Painter's Three Daughters, by Palma Vecchio." It is impossible to recognise in either of these three squalling girls, with mouths most unpictorially open, the Juno-like beauty whom Bordone loved to paint. A holy family, by Palma Vecchio, is lent by the Queen, from the Hampton Court collection. In this, the St. John, who has attained to manhood during the infancy of his divine cousin (contrary to the opinion of St. Luke) has a fine face ensconced in a veritable bush of hair. A nobly modelled and tenderly treated St. Sebastian, by Palma *Il Giovine*, is attributed in the index to *Il Vecchio*. The Holy Family by Parigi Bordone, from Hampton Court, is an inferior work, for which these same damsels of the Palma family have been models. Sir William Drake sends a fine painting of Piero de' Medici, by Bronzino, in good preservation, with massive features, and most uncompromising aspect—a thoroughly characteristic portrait. Two very poor specimens, said to be by Sandro Botticelli, are without interest, unless it be from the fact that the worse drawn of the two is exhibited by Mr. G. D. Rosetti; which may explain certain peculiarities of style. One picture is attributed to Annibale Caracci, two to Gaspar Poassin, and one to Nicholas Poussin, which are best complimented by silence. The most noticeable work of the minor Italian masters is a large *noli me tangere*, by Baroccio, 110 in. by 74 in., the property of Mr. Wentworth B. Beaumont. If abstraction can be made of the utterly undignified conception, and thoroughly conventional treatment of drapery, this is rather a pleasing picture. The composition is effective, although the left leg of the Christ is nowhere to be seen. The colouring is bright and lively; the Magdalen, the reverse of either a mourner or a penitent, is a remarkably gay, pretty girl, coquettishly and tastefully dressed. The shadowy outline which gives such delicacy to the faces painted by this artist is most conspicuous in these two very youthful countenances.

Passing to the great feature of the exhibition, we note no less than thirty-two paintings by Vandyck, a most unusual wealth of portraiture. Of these a couple of dozen are the studies contributed by the Duke of Buccleuch, to one of the most remarkable of which we have above referred. The portrait of the Marquis Spinola is lent by the Earl of Hopetoun; the complexion as fresh as if painted last year. The stern, crafty face looks out from the canvas as if its owner were ready for intrigue or for war. Nothing but the gleam on the armour recalls the lapse of nearly two centuries and a half. The portrait of James Stuart, Duke of Richmond and Lennox, is lent by the Duke of Buccleuch. It is a wonderful physiognomical study, and a marvellous painting. Then comes the noble Governess of the Netherlands, before mentioned. The profile of Henrietta Maria, Queen of Charles I., lent by the Queen from Windsor Castle, with a bust as flat as a pancake, shows that, as with lesser painters, the magic of this great master's touch might at times be impaired by the weight of a royal command. We should be much obliged to the writer of the catalogue to explain whom he intends to designate by the title of the Queen of Philippe le Roi,—a full-length portrait of a full-formed young beauty, in a black dress, half frightened at her own splendour. The bunches of pale brown curls, and faintly defined eyebrows, of which the right is arched more than the left, agree with the inscription, "Æt. Suæ 16, 1631." The husband of this stately girl, the Counsellor Le Roi, not the King of Spain, a noble-looking man, also in black, with sharp face and hand resting on a noble deerhound, is the companion picture. These fine portraits, 80 in. by 48 in., belong to Sir Richard Wallace.

By Rubens there is one portrait only. It is life itself—a man in a ruff and sable-lined robe, lent by Earl Brownlow. There are three landscapes, with cattle and figures, by Sir Peter Paul, tolerably well known; the "Timber

Wagon" (51), "The Rainbow" (125), and "The Watering-place" (195). Five paintings are attributed to Rembrandt—the old lady in the ruff, who was eighty-three when the painter was twenty-eight, which disposes of the maternity question; the old lady in conventual dress; portraits of the Burgomaster Palikan and his wife, the former in a falling ruff, with a fine sad countenance, looking out from the canvass, and a chubby ugly boy—the latter with a miraculous quilted ruff, within which is a very vigorous and masterful life. The child, to whom she is giving a dollar, has an unmeaning face, older than that of the mother. The signature "Rembrandt," casts some doubt on the authenticity of this portrait, as well as on the companion piece, exhibited by the Duke of Buccleugh.

Sir Richard Wallace lends two portraits of Spanish Infantas, by Velasquez. These pictures, together with some others from the collection of the late Marquis of Hertford, seem to have suffered by long keeping in the dark. Nine pictures have the assurance to claim Holbein as their father. If the portrait of Archbishop Warham be from the easel of Holbein, he must have intended it for a sign-board. The portraits of Sir W. Butts and his lady, are subtle in their physiognomical power. The keen, penetrating glance, and irritable yet humorous mouth of the physician to whom Shakspeare flung a crumb of immortality, are admirable. The lady looks well content to be so.

There are seven pictures by the English Vandyck, Nos. 140, 202, 247, 254, 257, 260, 263. The first of these, the portrait of Lord Camden, shows how noble a fine face may look in a formal wig. There is a soft, shadowy outline to the features of the great judge that recalls the touch of Baroccio. The second, belonging to the Marquis of Hertford, is gone. It looks like the ruin of a Romney. It is inconceivable that, as mere matter of manipulation of colour, it should be by the same artist as No. 247, a very fine, bright portrait of Vestris, a young man in a full mass of powdered hair thrown back from the face. Lady Mary Boultby looks out from the canvas with her blue eyes, set off by her grey powdered hair, and square-cut red silk dress. No. 257 is rather gone. It might stand for Jonathan Wild. Lady Lucy Douglas is wonderfully poor for a Gainsborough, if such it be. Mary, Duchess of Montague, grand-daughter of the Great Duke of Marlborough, a stately and beautiful lady, might almost be taken for a portrait of Maria, Marchioness of Ailesbury.

The sixteen works by Sir Joshua Reynolds are enough to fill the mind with rage. Certainly there is sufficient to prove that this great painter was not over-estimated by his contemporaries. But here and there a picture, left as it came from his brush, shows what terrible havoc Time has wrought with the majority of his paintings. We are familiar with many of them by engravings. But the best of these reproductions are but feeble shadows of the fleeting beauty of the originals. We know Reynolds only by ghosts. The exquisite beauty of the "Comedy," who has enchained Garrick—and small blame to him—by her irresistible charms, is not even hinted at by the engraving. This noble picture is sadly gone. "The Jessamy Bride," two portraits, the "Infant Academy," Lord Hertford's portrait of a Lady in a blue dress, the charming "Infancy," the fascinating Nelly O'Brien, are faded, tarnished, or cracked. In Mr. Cowper-Temple's "Girl leaning on her Hand," with a face so full of fun, the bitumen comes out in pitchy bubbles. "Cupid Disarmed" is sadly spoiled. The ruin of these beautiful pictures is rendered more deplorable by the striking contrast afforded by the admirable condition of Lord Hertford's portrait of MRS. Robinson (143), in which the charms of a somewhat discontented beauty are fresh and bright.

Sir Peter Lely's portrait of Lord Chancellor Clarendon in his robes is a noble picture. The florid face, youthful aspect, trim moustache and royal of the historian, seem an anachronism when attired in the gold and black robe of State, with the heavily embroidered purse for the Great Seal on the table. There is a fine portrait of a Sculptor (88), in which a marked trait of the sculptor's hand,—the division of the little finger from the others,—is marked. The head is dignified by a cloud of yellow hair,—the falling band is tied in an unusual and very picturesque fashion. The portrait of the Countess de Gramont is from Hampton Court. That of Lady Elizabeth Wriothesley is marked by the overstrained histrionic attitude so common in the painting and sculpture of the day.

A RESPONSE TO THE QUEEN'S LETTER.

DECEMBER 30TH, 1871.

THE letter of her Gracious Majesty to her people has been read far and wide, and has touched the hearts of all. We need make no apology for printing the following response.

A GOOD and gracious ending to the year
Thy letter to thy people comes, O Queen!
Right welcome to them are its genial words,
Breathing calm confidence and trust serene.

Calm confidence in their firm loyalty,
And trust serene in their large, loving heart;
'Tis not the first time thou dost truly say,
That in thy sorrow they have taken part.

How their hearts wept with thine ten years ago,
When he who well deserved those anguish'd tears—
ALBERT THE GOOD—was taken from thy side—
Thy loss and theirs, to ever-coming years.

Yes; still they mourn that upright man, who lived
As if he held from Heaven the high behest
To prove himself to his adopted land
True bearer of his motto—TREU UND FEST!

And when, but now, the darken'd wings of Death
Seem'd closing once more o'er thy sadden'd soul,
Thy people's prayers for thy son's life went up
To Him who can both life and death control.

At length, when better tidings were sent forth,
And hope revived within each watcher's breast,
How joyfully they hail'd the cheering words,
Which gave their anxious fears some little rest.

And now they wait, in tremulous regard,
For every whisper from that royal home,
And feel it is their own peculiar friend
Who from Death's shadowy portals back doth come.

If it could be that any closer tie
Were needed, 'twixt the nation and its head,
'Twould surely spring from this deep sympathy
Which centres round our Prince's still sick bed;

And from thy noble-hearted words, O Queen,
With those of that sweet lady by thy side,
Whom thou dost call thy daughter, and who long
Has been thy faithful people's joy and pride.

May God in mercy grant our mutual prayer,
And soon again to health and strength restore
The son, the youthful husband, father, friend,
Whose kindly face we long to see once more.

R. F. H.

THE NEW GUILDHALL AT WINCHESTER.

THE ceremony of laying the foundation-stone of the proposed new Town-hall and Public Offices at Winchester, which had been postponed on account of the illness of the Prince of Wales, was performed on Friday, the 22nd ult., by Viscount Eversley, the high steward of the city. The new building, which will be situated on the south side of the High-street, nearly opposite to St. John's House, includes a large assembly-room, 85 ft. by 45 ft., a council-chamber or sessions-hall, magistrates' room, public museum or library, offices for the town clerk and city surveyor, committee-rooms, police station, with apartments for superintendent and policemen, fire-engine house, &c., the whole of the interior being warmed by hot water. In the centre of the principal front a clock-tower rises to a height of 120 ft. to the top of the vanes, the faces of the clock being 85 ft. from the ground, and if illuminated will be seen from most parts of the city. The design of Messrs. Jeffrey & Skiller, architects, of Hastings has been accepted, the estimated cost being 11,000*l.*; and Messrs. Joseph Bull & Sons, builders, of Southampton, have contracted for its erection for the sum of 10,496*l.*

The mayor and corporation assembled at half-past one o'clock, and a procession of the civic, clerical, and other authorities, headed by the band of the 60th Rifles, escorted Lord Eversley to the site of the new hall, where the stone was laid with the usual formalities, in the presence of a large crowd of spectators. On arriving at the site, Lord Eversley expressed his thanks to a merciful Providence which had enabled them to meet after the postponement. The mayor then requested Lord Eversley to lay the foundation-stone, and Mr. Alderman Budden, as chairman of the building committee, briefly described the intended new structure. The Archdeacon of Winchester then offered prayer, and Lord Eversley, having been presented with a silver trowel, laid the stone. The mayor thanked his lordship for the performance of the ceremony, and he, in return, addressed the mayor and citizens in a graceful speech, alluding to the fact that Winchester claimed the precedence of London for municipal institutions.

DRAINAGE OF WEYMOUTH.

SOME time ago, after a visit to Weymouth, we commented somewhat strongly on the sanitary condition of this otherwise agreeable watering-place, especially in connexion with the state of the Backwater. We are glad to hear that the Town Council are now considering a plan which has taken six months to prepare. It is proposed to construct a dam across the Backwater, and to form intercepting sewers, so as to carry the sewage from the Backwater. The system of sewage irrigation is also proposed, the estimated cost of the whole works being 27,600*l.* The scheme is said to be generally approved by the local authorities, and will, it is expected, be speedily carried out. If the town be wise they will allow no time to be lost after satisfying themselves that a really good plan has been obtained.

THEATRICAL.

AMONGST the good things going on at the theatres just now—and there are several—should be specially noticed "Pygmalion and Galatea" at the *Haymarket*, "The Bells" at the *Lyceum*, and "On the Jury" at the *Princess's*. The Greek interior prepared for "Pygmalion" shows care, and is very satisfactory. The statue was modelled by Mr. Birnie Phillip. The writing of the piece is admirable, and, if we mistake not, it will live. Miss Robertson particularly distinguishes herself in it, and Miss C. Hill displays force which few gave her credit for. The acting of Mr. Henry Irving in "The Bells" is a thing to be seen, and places the actor high in his profession.

Covent Garden.—Mr. Augustus Harris has again succeeded in producing incomparably the best pantomime of the season, both as regards its composition and getting-up. The story of "Blue Beard" is followed with consistent burlesque, and the scenery, processions, and ballet are fittingly gorgeous. The review of the troops, with a military revel, is one of the most remarkable scenes of its kind ever presented.

COMMON SENSE IN STAGE SCENERY.

WHEN considerable thought and expense are bestowed, as now, upon the imaginary fairy scenes at our theatres, to satisfy the tastes of the public, as also in competition one house against another, it is very distressing to find that a little common sense is not bestowed upon the scenes of ordinary pieces, especially in reference to the positions of doors and windows. Let me state one example, which is like many, as an illustration of the want of common sense. The fact that the *Builder* was the first who struggled to reform stage-scenery will be my excuse for sending this to you. In the neat piece now being played at the Princess's, wherein two of our best actors in their individual walk, and a very promising and improving young actress, take part, there is a scene of an interior, which is made use of more than once, and where, facing the audience, there is a window, showing a distant view of the clock-tower of the Houses of Parliament and the tops of many houses, which, no doubt, is intended to make the audience understand that the river Thames flows between the room in which the action takes place and the prospect seen through the window. Within 5 ft. or 6 ft. of this window, in the same wall, is a much-used *door*, so much used, indeed, that I was kept in a state of excitement whenever an exit was made, expecting that a violent scream would be heard from the person just departed, on account of his having tumbled headlong into the street, if not into the bosom of Father Thames; and, what is still more ridiculous, in one instance the departed was looked after by

one present in the room, who, gazing through the open doorway, turned his face towards the position of the window. In reality such an arrangement is impossible; in ideality it is truly ridiculous; and I ask again, why cannot a little common sense be brought to bear upon such matters, which destroy all truthfulness in any piece placed before playgoers who may be otherwise carried away with the natural and painstaking acting of the performers? Y.

OXFORD-STREET TRAMWAYS.

BY the reproduced and reprinted London Street Tramways (Extensions, &c.) Bill, which was rejected by the House of Commons last year, it is proposed that powers should be conferred upon the company to lay somewhere about 16½ miles of tramway in some of the principal streets of London. The thoroughfares include Edgware-road from Kilburn, Oxford-street, Grand Junction, Marylebone, and Uxbridge roads; Holborn, Holborn-circus, St. Andrew's-street, Shoe-lane, St. Bride-street, Farringdon-street, and Ludgate-circus; Goswell-road, Aldersgate-street, and St. Martin's-le-Grand; the Borough High-street, York-street, and St. Thomas-street, Denman-street and Duke-street; Marylebone-road, Chapel-street, Upper Baker-street, and Albany-street; Harrow-road, Portobello-lane, Westbourne Bridge, Westbourne-terrace, and Bishop's-road; Craven-road, Eastbourne-terrace, and London-street. The promoters bind themselves not to lay their lines upon or along the London Bridge Railway Station or station-yards, or any of the streets, roads, or other approaches leading thereto from the Borough High-street or Wellington-street without the consent of the companies in writing under their common seals. The railway companies will not be the only or the most formidable opponents of the proposed tramways.

INAPPROPRIATE CLOSING OF THE BRITISH MUSEUM.

SURELY some of our public institutions are managed with very little wisdom. On New Year's day the British Museum was closed for the purpose of being cleaned and making additions to its collections. It will be re-opened to the public on Monday next, the 8th inst. But why close it on New Year's day; another week would surely answer the purpose if it need be closed at all. We saw scores of holiday people within a brief space of time, who had toiled up to the Museum looking with dismay at the intimation that they had toiled for nothing, and worse than that, that their day was spoilt. Let us suggest to the trustees that another arrangement should be made next year.

THE DESTRUCTION OF BOILERS.

SIR,—My engine boiler, a Cornish one, nearly new, is much pitted or eaten on the upper side of the flues, which I attribute to the alum in the water. Of course it never encrusts or "furs up." I think of introducing some hot lime into it, to counteract the sulphuric acid of the alum. The boiler is now empty and dry, except the small "pits" (which are nearly half through the plates, and about ¼ in. diameter), which are wet with a fluid of rather a sweet taste and of iron. Will any of your engineering friends assist me?

W. D.

THE MINEHEAD RAILWAY.

THE first turf of this line was cut on the 28th ult. The contractor for the execution of the works is Mr. Frederick Furniss, of London. The finances requisite for the undertaking have been raised independently of the public. This branch line of railway leaves Watchet by a junction with the West Somerset Railway; and it was intended in the original Bill to cross the two turnpike-roads (one of which leads from St. Decumans, and the other from Doniford to Watchet) by level crossings; but, on the representation of the inhabitants of that place, it was afterwards arranged to divert the least important road, and the other to cross over the railway by a bridge near Mr. Thorne's yard; thence through the pasture-field, over the mill-stream and meadow, and cross the Mineral Railway at Whitehall, running by the side of that line up the valley, until within about half a mile of Washford. It then curves to the right and enters a deep cutting on the north side, and closely adjoining the turnpike-road at the Green Dragon stop-gate, this being the most important piece of work throughout. Soon after it enters the valley at Old Cleve, and runs down to the sea at Bradley-gate, where it is intended to erect a station for Blue Anchor, Carhampton, &c. Thence from this point it runs parallel with the seashore, and between Higher and Lower Marsh there will also be a station for Dunster, &c., which is rather over half a mile distant. Afterwards it is a perfectly straight and level line to Minehead, the terminus being near the beach. The contractor is to complete his undertaking by the end of the year 1872, and the railway will afterwards be leased to and worked by the Bristol and Exeter Railway Company, with whom terms have been arranged.

COMPETITION, BERLIN.

WE are requested to announce that the First Commissioner of Works has received a programme for the erection of a new House of Parliament at Berlin, for which the architects of all nations are invited by the Imperial Government to compete. The particulars will be reprinted for the use of architects, and be ready for distribution at the Office of Works on Monday next. The designs will have to be sent in to the Imperial Chancery at Berlin, with the authors' names, before the 15th of April next, and a prize of 844*l.* will be given for the best design, and a fifth of that amount for each of the four next best designs.

"JACK PLANE."

SIR,—Would you oblige me by receiving the inclosed 1s. (stamps) for the benefit of the widow and children of the late Mr. Randall (Jack Plane), and at the same time allow me to appeal to all working men who have been readers of the sensible, manly, out-spoken letters our deceased friend was in the habit of writing in the *Builder*, to contribute a trifle, according to their means, and so in some measure to console the widow and fatherless. An accident, any day or hour, might reduce those near and dear to us to poverty. ONLY A TAILOR.

SURRENDER OF HOUSES BY A BANKRUPT TO THE SELLER.

IN the Court of Bankruptcy, before Mr. Registrar Spring-Rice, *in re* Lessiter, Mr. Webster, on the part of a debtor, who is a builder, made an application to the Registrar, under the 23rd section of the Act, under the following circumstances:—Shortly before he presented a petition for liquidation he had contracted with the owner of some building land to purchase two carcasses of houses and fit them up, and he now wanted to surrender them to the seller.

The Judge said that in all bankruptcy cases such an application could only be granted after notice.

Mr. Dalton, who represented the trustees, stated that there were no rights of third parties to be interfered with. It appeared that a building contract had been entered into, between a person named Evans and the petitioner, that Lessiter should buy two carcasses in Tuffnell Park-road, at a ground-rent of 8*l.* each, Lessiter contracting to finish them, and lay out 300*l.* The trustees were most anxious to disclaim the property, inasmuch as the charges upon it would be more than its value, and they were in this position,—they must either disclaim or be called upon by the ground landlord to complete the contract.

Under the circumstances of there being no third parties to be injured, the application was granted.

THE QUESTION OF WAGES.

WE are requested to state that a copy of the following has been forwarded to the employers in the building trade of London and vicinity:—

"Paviors' Arms, Johnstone-street, Westminster,
January 1st, 1872.

Sir, — As the representatives of the Operative Stone Masons' Society in London and district, we again take the liberty of addressing you, in accordance with a resolution passed at a general meeting of the above-named society in reference to the nine-hours question, and also another matter appertaining thereto, viz., the question of wages. And in referring to these questions, we would beg leave to draw your attention to the rapid and daily increasing adoption of the nine-hours system throughout the country, and to the innumerable number of artizans that will commence that system from this day, at the same wages for the nine hours as they previously received for ten hours; and in many cases this has been conceded by the employers without a request from the employed. Another significant fact that we would call your attention to is, the adoption of the nine-hours system by several of the large railway companies,—a class of employers that hitherto have not proved themselves very anxious to meet the just demands of those in their employ, not even sufficient to secure the public safety. Seeing such to be the case, and knowing that employers in the building trade of London and its vicinity have generally been willing to meet any just requirements of those in their employ, providing that reasonable notice of those requirements be given to insure the employers against any serious loss, we therefore beg to give you notice that the masons of London and its vicinity are desirous of continuing the nine-hours system, as at present established, all the year round, instead of expiring on the 14th of February, as now arranged, and that we are willing to work at the present reduced rate of wages for the next six months; and that on and after the 1st of July, 1872, the wages be 9*d.* per hour, making our average weekly wages, as near as possible, the same under the nine-hours system as that hitherto received for the ten hours.

We hope, sir, that, in considering this request, you will keep in view the foregoing remarks, and grant us a favourable reply at your earliest convenience.—I remain, sir, your obedient servant, P. WRIGHELL,
Secretary to the Committee.

Resolution passed at a General Meeting, Nov. 30th, 1871.—"Resolved, That our committee memorialise the master builders of London and its vicinity, asking them to concede the nine hours permanently, after February 14th, 1872; and give notice, at the same time, that on and after the 1st of July, 1872, we shall require an advance of 1*d.* per hour."

BUILDING ACT CASES.

AT the Woolwich police court, before Mr. Patterson, on Wednesday last, Mr. Collis, district surveyor, summoned Mr. William Tamsett, builder, of Charlton, for neglect to give notice for certain works done at No. 1, Inkerman-terrace, Charlton; to wit, constructing brick-work and flue to two coppers, the plea set forth being that the work was there before, but required rebuilding. The magistrate decided that Section 20 brought the work within the rules. Penalty, 20s.

HOUSE-DRAINAGE.

SIR,—An article in your valuable journal of last week, under the above, and signed, "D. A.," suggests that corporations should take this work entirely into their own hands, *it* being the *only* means of having satisfactory drainage. I would venture to suggest that the "respectable builder," or firm, should be employed for this work, without being subject to cutting down the price to the lowest fraction, which, of course, leaves no alternative but to encourage bad work. Is drainage the only work found fault with? Is it not a fact that works of every description have to be done over again simply because the "respectable builder" is cut out of his work through men who know or care not how work is done, so long as they make a profit? Who, may I ask, is to blame in this matter? Is it to be supposed that a speculative builder has no more sense than to spend 30*l.* or 40*l.*, in order to make a good and complete job, if he is only to receive one-half this amount from his client in return? Again, are corporate bodies, as a rule, all perfection? Would it be impossible for such a body of gentlemen to have the pipes laid to the wrong inclination, or even *upside down?* Let the public be satisfied to pay a fair price to respectable men, and doubtless they will get fair work in return. W. H. W.

THE ACTUAL CONDITION OF WARWICK CASTLE.

THE Chairman of the "Warwick Castle Restoration Fund" has sent us the following report on the condition of the building:—

"*Dec.* 28, 1871.

Dear Sir,—In reply to your request that I should send a statement of the extent of the destruction caused by the late fire at Warwick Castle, I beg to forward you the enclosed report.

The most ancient parts of the Castle are the vaulted basement under the state rooms, hall, &c., the main wall on the river front, some internal walls, and the towers and gateways on the courtyard walls. All these are uninjured by the fire.

The international decorations have been executed at periods ranging from the date of Charles II. to the present time.

The distinction between the state apartments and those used by the family is not so marked as has been supposed.

The whole of the rooms have been more or less occupied.

The present family, in order more freely to admit the public, have chiefly inhabited the east wing, but have never given up occupation of the rest when occasion required.

The main walls of the east wing are of the same date as the west. The rooms have been entirely reconstructed, and some years have been spent in decorating them with objects of antiquity procured from Italy and elsewhere.

The following is a list of the rooms and principal objects destroyed:—

The Hall—totally, except the outer walls, the roof of which was constructed about forty years ago, when the remains of a very early roof were discovered (1150). The panelling was of the

date of Charles II. All the furniture, chests, silks, embroidery, tapestry, the principal portion of the armour, including the buff coat of Robert Lord Brooke, and Charles Edward's sword, are entirely lost.

The Marble Floor is also much damaged.

The Large Dining-room—partially injured.

Breakfast-room (*temp.* Charles II.), the Library, Lord Warwick's Sitting-room, and Staircase are totally destroyed.

Lady Warwick's Boudoir—Partially burnt.

Three rooms had been recently reconstructed and filled with ancient furniture and fittings, comprising Italian chimney-pieces, doorway and columns from Rubens's house at Antwerp, old Italian bookcases, tables, &c. The most valuable books and pictures were preserved; but a portrait of Francis, Earl of Warwick, by Gainsborough, a portrait of the first Lord Brooke, and various others, were destroyed.

Above were seven bedrooms, furnished with old leather pictures, carving, &c., all totally destroyed.

Above the dining-room were three large bedrooms, with other rooms above them; these also are destroyed, as well as three rooms on the basement.

The contents of the dining-room, state rooms, and armoury passage were removed, and are uninjured.

The whole of the state rooms and chapel west of the hall were not touched by the fire.

A. SALVIN, JUN."

CONSECRATION OF RYDE PARISH CHURCH.

ON Tuesday the new parish church of Ryde—the corner-stone of which was laid in August, 1869, by the Princess Christian, as the representative of her Most Gracious Majesty the Queen, and which has been built by Mr. Gilbert Scott, R.A.,—was consecrated by the Bishop of Winchester.

The structure is not yet completed. The tower and spire are not commenced, and the ornamental details of the exterior are not fully carried out. The north porch, too, is not at present begun. The great east and west windows are by Messrs. Clayton & Bell. The interior carving of the church has been executed by Messrs. Farmer & Brindley. The capitals of the arcades are cut in foliage, natural leaves alternating with conventional through the series. The pulpit is of variegated alabaster, and is based upon a cluster of fluted columns of polished Derbyshire marble. It is octagonal, two of its sides being open to form an entrance; the other six are deeply sunk in panels, into each of which are introduced subjects sculptured in white alabaster, each panel comprising two representative figures of Old and New Testament or pre-Nicæan saints and martyrs. Thus there are combined Isaiah and Jeremiah as prophets; St. John the Baptist and St. Barnabas as preachers; St. Peter and St. Paul as apostles; St. Stephen, St. Alban, St. Agnes, and St. Catherine as martyrs; the sixth pair being the Virgin Mary and Mary Magdalene. This work has been executed by Messrs. Twigg, of Ashford, Derbyshire; and the panels are by Messrs. Farmer & Brindley.

THE SMOKE NUISANCE IN BRISTOL.

A FEW days ago Mr. Arnold Taylor, of the Local Government Office, attended at the offices of the Board of Health, Bristol, in pursuance of a memorial from certain ratepayers, to make an inquiry with reference to the smoke nuisance in Bristol. A large number of tradesmen and others tendered evidence to prove the existence of a great nuisance in smoke, smuts, and deposits of small coal. Among the large establishments generally complained of were Messrs. Fry & Sons' cocoa manufactory, Messrs. Finzel's sugar refinery, Counterslip; and the Porter Brewery, in Bath-street. The proceedings lasted about six hours.

At the close, a discussion took place, in the course of which the Government Inspector said his opinion was that an inspector should be specially appointed to look after the smoky chimneys, and he suggested that other cases might be taken before the magistrates. The smoke nuisance would never be abated in large towns until they got the local authorities to take severe measures, and make it a matter for general police duty. They had a stringent Act in London, and it was put into the hands of the police, and every policeman on the beat had orders to report every case of smoke nuisance to his inspector. The Inspector mentioned incidentally that in Bradford the local authorities had taken the matter in hand, and the nuisance in that town had been reduced quite 50 per cent. What he wanted the Board of Health to do was, to look at it in this light, that a smoke nuisance was a preventible nuisance, and that it could only be dealt with by careful and continuous inspection; and he suggested that the Town Council might appoint a Smoke Committee independently of the Board of Health.

Eventually the Inspector intimated that he should report what he had heard to the Local Government Board.

Books Received.

"CHOLERA and Typhoid Fever: a Plan for the Collection and Disposal of Sewage on the Separate System. By J. B. Waring, F.R.I.B.A., &c. Day, Savoy-street, Strand." Mr. Waring here advocates what seems to us a very impracticable system, however correct it may be theoretically; and above all impracticable on the great scale for towns. The Moule dry-closet system is a good one, as an adjunct in country districts, or in or adjoining bedrooms for the use of the sick, &c.; but Mr. Waring out-Moules even the Moule system. He says,—

"The plan I propose is this. Keep the fluid and solid refuse of your houses carefully apart. In every house there should be a well-built and spacious soil-shaft, with which every closet is to be connected. The seat of the closet is furnished with a pan having two separate vents, one for the liquid, the other for solid excreta. The liquid will flow off into a tank or reservoir prepared for its reception alone, and furnished with a tap, by which it can be taken off as required, and either be converted into ammonia, be used for any manufacture in which ammonia enters, or be otherwise utilised. The seat itself, when pressed on by the body, should cast a superficial layer of earth, sand, or soot, on the bottom of the pan,—the soot might be collected or kept in the house for the purpose; the excreta deposited, a covering layer of sand, earth, or other deodorising material, should be discharged over it, as in the earth-closet patented by Moule. The pan should be furnished with a reversible bottom, and the excreta, thus thoroughly enclosed by a deodorising coating, will fall into the soil-bin beneath, forming altogether a very powerful manure, and be taken away at stated intervals by a well-organised service of closed trains, very different to our present clumsy open carts; by steam-carriage in large towns, and by carts in small, or by hand in villages, to properly-constructed receptacles in the country, and be sold (I believe at a very great profit) for manure, either in the immediate neighbourhood or wherever desired, with perfect ease, and with freedom from danger to health to any human being. We shall thus, by the aid of a little thought and care, have transformed our demon of death into an agent of life.

The ash and dust bin may be kept separate from the soil-bin; that is a matter of the simplest arrangement, and can be easily effected by a separate shaft. The servants' closet might be separate, and attached to a separate ash-pit, having special openings to the dust-bin and liquid-tanks, for the riddance of basement refuse.

We have still the slops of our houses to deal with; and this is yet more easy, by means of a sink on one side of the closet, communicating by a pipe with the special slop-tank beneath or by connexion with the sewers, which are to convey away fluids only."

So, even on this system, we come to sewers and tanks at last. And yet Mr. Waring says:—

"Cesspools, drains, and sewers form a legacy from our forefathers which we shall act wisely henceforth to repudiate. Cesspools are generally abolished; drains and sewers we still stick to, and they to us. By the addition of more water, great care, improvements of construction, and the separation of the liquid from the solid matter at the reservoir, we shall have freed ourselves from their most deadly results; but we have only 'scotch'd the snake, not killed it.'"

——"Specification of Sir George Bowyer, bart., for Improvements in the Construction of Road Tramways. Clayton & Co., Whitefriars, Printers." Sir George has patented a simple plan of laying a tramway in asphalte, the wheels merely running in an easy groove a little below the level of the road, and into and out of which they can readily go. The asphalte is to be laid upon concrete, and can be drained by pipes beneath. If sharp-edged wheel-tires, he notes, wear the asphalte rapidly, they may be rounded off. This might be done in the case of the cars, but other wheels might waste the asphalte as well.

——*The Garden* says,—What a pity it is we do not contrive some less expensive and more attractive way of destroying the thousands of evergreens planted about London every year, than that of planting them and allowing them to blacken and perish before our eyes from the effects of our smoke-pested air. There perish annually as many beautiful young evergreen shrubs and trees in and near London from smoke as would suffice to plant a whole country. We know no greater evidence of obtuseness of mind than is shown by this persistent wasting of precious time and precious energy, and destruction of healthful and beautiful young evergreen trees and shrubs. It cannot be too widely known to every town-planter that so long as we are satisfied to live in a sea of the refuse of our fire-places, so long shall we find it impossible to have in cities healthy specimens of vegetation that retain their foliage in winter.——The *Art Journal* for the new month, says of Japanese Paper:—"Upwards of 250 distinct species of paper are manufactured in Japan. Many kinds made in the distant provinces are submitted to a distinct process in Yedo, and each kind has its distinctive name. Specimens of all these have been deposited, by the care of the Foreign Office, at the South Kensington Museum. We have little doubt that the manufacture of paper in this country will be affected by the acquisition of this valuable knowledge as to the mode of preparation of an article very superior to our own. The point most against the introduction of the bark of the *Bronssonetia* to our mills is, that it is not until the fifth year that the stools or shoots of the tree, resembling the shoots of the hazel in English coppices, are available for bark. The importation of the peeled fibre will probably be attempted. The substitution of a finer vegetable paste for any coarse and inferior size is no doubt one great cause of the excellence of the Japanese paper. The Tororo root would probably bear exportation as well as the fibres. If perfectly clean and pure fibres and roots were introduced, and Japanese workmen induced to show the process employed by them to the foreman of one of our mills, there seems little reason to doubt that, with the aid of our excellent machinery, we should soon produce such admirable paper as the world has never yet seen."

Miscellanea.

Warwick Castle.—On Tuesday evening in last week, the second meeting of the Warwickshire Archæological and Natural History Society was held at the Court-house, Warwick, when Mr. Tom Burgess, of Leamington, gave a brief history of Warwick Castle, from the earliest period to the time of the "King Maker." The lecturer gave an interesting account of the ancient earthworks yet remaining on the line of the Avon, and pointed out that these were evidently the frontier fortresses of an early tribe. Warwick was doubtless one of these frontier posts, and the mound in the court-yard was probably the site of this fort, if not the original mound itself. The subjection of Warwickshire to the Romans was dwelt upon, and then Mr. Burgess read the extract from the Saxon chronicle giving an account of the erection of the castle at Warwick in 913, not 915, as stated by Dugdale. This castle was one of a series of frontier Saxon fortresses erected by the daughter of King Alfred to repel the incursion of the Danes settled in Derbyshire and Leicestershire, on the east of the Watling-street Road, under their chief, Guthrun. The story of Guy and the Dun Cow was traced to the contemporary conflicts with the Danes, for Dun Cow was probably but a corruption of Danegau. Sketches of the original fortresses, and the probable appearance under Ethelfleda, and Turchill, were made on a black board. The demolition of the old castle, by the adherents of Simon de Montford, led to a summary of the progress of military architecture, and the present castle of Warwick owes much of its design to the lessons gained at the famous siege of Kenilworth, and the subsequent Scotch and French wars. It was this experience of the powers of attack and defence which induced Thomas, Earl Beauchamp, to erect the towers and outer defences on the east of the castle, as we see them now. Some floral legends connected with this period, the *planta genista*, the forget-me-not, and a peculiar Warwickshire legend of the red rose were related. The fact that Wycliffe translated the Bible, and that Chaucer and Gower were living during the building of the castle, was mentioned.

Photographs enamelled on Copper.—The *Illustrated Australian News* states that at Clunes a photographer named John Tanner has, after four years' labour, succeeded in producing photographs enamelled on copper. We may state, however, that five or six years ago a photograph was sent us from Canada which seems to have been enamelled on zinc. It had all the delicacy and fine texture of a daguerreotype without its metallic glance.

International Trade-marks. — The following American case is reported by Haseltine, Lake, & Co., patent solicitors:—"An equity suit respecting trade-marks, of international interest, was recently decided in the United States Court for the Washington district. The suit was instituted by Mr. David A. Burr, counsel for Rogers & Sons, the celebrated cutlers of Sheffield, against Philp & Solomons, contractors to the Treasury department for the supply of Rogers & Sons' cutlery. The plaintiffs alleged that the defendants had supplied counterfeit articles with their trade-mark, and they asked the court to grant an injunction, and claimed heavy damages. The defendants did not deny the sale of imitation articles or the use of the trade-mark in question, but proved that these articles were manufactured in Prussia by a firm known as Rogers & Sons, who use the trade-mark under a royal licence, and that Prussian cutlery bearing this trade-mark had been extensively imported and sold in the United States for many years, and also that the plaintiffs had not registered the trade-mark, as provided by the recent Patent Act. The defendants contended that the suit could not be maintained in view of the above facts. Wylie, J., refused the injunction chiefly on the ground that the plaintiffs had, by their acquiescence in the infringement, waived their right to assistance from the court, and he also stated that the Prussian firm was entitled to the use of the trade-mark where the cutlery was manufactured. The acquiescence of the plaintiffs was presumed, no evidence being offered to show that the trade-mark had been used with the consent or knowledge of the Sheffield firm. The judge did not comment upon the fact that the plaintiffs had not registered their trade-mark, but the registration of trade-marks in the United States is now a matter of the first importance to English manufacturers and merchants, for which provision was made in the Act of last year."

Building Materials and Fire.—Mr. Mullett, the supervising architect of the Washington Treasury Department, U.S., has been interviewed. He says:—"Cast iron, absurd as the statement may appear, will not resist as much heat as good sound oak timber of the same dimensions. Fire expands the iron and warps it and breaks it very easily. Indeed, if oak timber should be treated by any of the processes of liquid silicate, it may be considered almost a fire-proof material compared with cast iron. As for stones suitable for building purposes, as I told you before, there are few that are fire-proof, though some approximate the necessary conditions, and, except in severe conflagrations, may be generally depended upon. Granite, marble, and sandstone are not to be trusted, as they soon perish by exposure to the heat, as has been shown a thousand times. But I am strongly in favour of liquid silicate as a preparation for wood to be used for building purposes. My attention was directed to this material some years since, but I have not had an opportunity to investigate the subject fully. I believe, however, that it merits more attention than any other suggestion that has been made public, and may yet prove one of the most practical solutions of the question of non-combustible construction that has yet been offered. Whether this or some other process for making wood incombustible is the more desirable, I am not prepared to say. I am, however, decidedly of the opinion that any process by which wood can be rendered non-inflammable at a reasonable cost would not only be an inestimable blessing to the public, but its use should be rendered imperative by law."

Accidents.—On Tuesday, during a heavy gale, a large brick building, the Rosebank Engineering Works, at Bonnington, near North Leith, was blown down. The loss is said to be upwards of 4,000*l*. Three or four men had a narrow escape.——While the petty sessions were being held in the village of Killyclogher, in Leitrim, the floor of the court-house gave way, and about 300 persons fell to the ground floor, a height of 18 ft. The magistrates and attorneys escaped unhurt.

Motive Power for Street Vehicles.—It is reported from New Orleans that a new way has been discovered to use ammonia as a motive power, the principle being that of the ice-making machine. Motion is obtained by rapid evaporation and energetic absorption. An ammonia-engine is said to have made 800 trips, and drawn a car at a much cheaper rate than it could be drawn by horses.

The Royal Institution Lectures.—Dr. J. Tyndall, F.R.S., is delivering a series of six lectures "On Ice, Water, Vapour, and Air," at the Royal Institution. In his second lecture he illustrated a subject to which we adverted in speaking of the address of the president of the last meeting of the British Association,—namely, the principle of arborescence, in what we may call mineral life. Professor Tyndall showed some beautiful examples of crystallisation by making salts and metals deposit crystals from small quantities of their solutions placed in the electric microscope. Silver and lead ferns appeared as if endowed with life; crystals of ferrocyanide of potassium were seen growing, in pulsating waves, as if the crystallising force had to accumulate strength every few seconds to overcome some resistance,—a phenomenon which has not yet, it is believed, been investigated by men of science; at all events, the lecturer said that it was a novel observation to him. Crystals of chloride of ammonium grew, like delicate and graceful ferns. Finally, the lecturer showed how, beam by beam, Nature builds up the crystals of ice, every portion of the structure being singularly beautiful; and he melted a thin slab of ice in the electric microscope, so that the observers could see on the screen the star-like forms of which it is built up. Both old and young listened to the lecture, as usual, with the greatest interest and pleasure. The theatre was filled to overflowing, many of the listeners being only able to obtain standing-room.

Mr. Ruskin's Christmas Gift.—In his twelfth number of "Fors Clavigera" Mr. Ruskin tells his working-class readers that he has made them the Christmas gift he promised—7,000*l*. Consols in all clear—"a fair tithe," he says, "of what I had, and to as much perpetuity as the law will allow me." He adds:—"It will not allow the dead to have their own way long, whatever licence it grants the living in their humours, and this seems to me unkind to those helpless ones. Very certainly it is inexpedient for the survivors, for the wisest men are wise to the full in death; and if you would give them, instead of stately tombs, only so much honour as to do their will when they themselves can no more contend for it, you will find it good memorial of them, such as the best of them would desire, and full of blessing to all men for all time." English law, he thinks, needs mending in many respects; in none more than this. As it stands, he can only vest his gifts in trustees, desiring them, in the case of his death, immediately to appoint their own successors, and in such continued succession to apply the proceeds of the St. George's fund to the purchase of land in England and Scotland, which shall be cultivated to the utmost attainable fruitfulness and beauty by the labour of man and beast thereon, such men and beasts receiving at the same time the best education attainable by the trustees for labouring creatures, according to the terms stated in his book.

Proposed New Swimming-bath and Public Bathing Station at Brighton.—A memorial is now in progress of circulation, which will shortly be presented to the Town Council, petitioning them to lease a portion of the beach, opposite the Norfolk Hotel, to Professor Cavill, the champion swimmer of the South Coast, for the purpose of erecting a swimming-bath there, and also for the formation of a public bathing station. The size of the proposed bath is 60 ft. by 30 ft. It will be provided with about thirty dressing-boxes, and will be built of concrete below the beach up to the height of 12 ft. or 14 ft., the top being surrounded by a glass screen, something after the style of those used at the head of the West Pier. Mr. W. W. Eldridge, of Brighton, is the engineer. The bathing station would be situated on the southern side of the bath, and would be screened from the public gaze by canvas stretched on poles, and reaching from the eastern and western walls of the bath down to the water's edge.

Hoardings in Newington. — The *South London Chronicle* says:—A very necessary precaution has been taken by the Newington Vestry. Builders must in future put up hoardings before pulling down old houses on the Walworth-common Estate, and where footways are disturbed a temporary planked footway must be provided. But why limit these provisions to this one estate?

Edinburgh.—The North Bridge is to be altered and widened at a cost not to exceed 10,000*l*.

Cheap Telgraphic Communication with America.—It is proposed that the Governments of Great Britain and of the United States should purchase the existing cables and Newfoundland land-lines, paying for the same in terminable annuities, and charging only such rates for the use of the cables as will meet the annual interest charge. For this purpose, *one-fourth of the existing tariff would suffice for the present*,—that is to say, messages of ten words could be carried for 10s., instead of 2*l*. It has been found that with each successive reduction in rates the use of the telegraphs has enormously increased, as is evidenced from the fact that the earnings are now much greater with the rate at 2*l*. than they were formerly at 20*l*. per message. It is believed that the reduction to 1s. per word would not be final, but that still further reductions might be made, and the number of cables increased on the same plan of terminable annuities, without becoming any burden on the two Governments. The attention of the various Chambers of Commerce in Great Britain is called by circular to this question by Mr. G. T. Snead, of 21, Mincing-lane, London.

Accommodation for Private Patients in the Fever Hospital, Islington.—The pauper fever asylums having now relieved the Liverpool-road hospital of the very poor, the committee have rendered the hospital available for the reception and treatment of other classes of cases, including the working class not receiving parish relief. Patients will be admitted into the general wards on the recommendation of a governor or annual subscriber of one guinea, or, as heretofore, on payment of two guineas on admission, or of one guinea weekly. For such patients as require isolation and better accommodation, eight large rooms have been prepared and furnished with every requisite for comfort, in which a single patient, or two children of the same family or from the same school, can be received. The payment for one of these rooms, with the attendance of an experienced nurse, and the care of the resident medical officer and physicians, and including food and medicines, has been fixed at three guineas per week. Members of working men's families will continue to be received into the hospital on much lower terms, we presume, than these.

Arbitration Case.—A case of considerable interest has just been concluded at the Westminster Palace Hotel. The Ryde Corporation have determined upon purchasing the works of the Ryde Gas Company, and the latter being willing to treat for the sale, the price was left to arbitration. The witnesses for the Corporation considered the value to be under 30,000*l*., and based their calculations upon a 16½ years' purchase of the net annual profit, which they placed at 1,800*l*. This they considered fair, as, though the company is incorporated by Act of Parliament, they thought it should not be treated as such, while the Corporation had the power to purchase. On the other side, it was argued that the company was incorporated, and was thus entitled to a twenty years' purchase. They placed the annual profit at 2,800*l*., and if this calculation was adopted, and a further sum allowed for surplus land and plant, the company would be entitled to a sum of over 60,000*l*. The arbitrators, Mr. Cawley, M.P., and Mr. Hawksley, C.E., with Mr. Hunt as umpire, have taken time to consider their award.

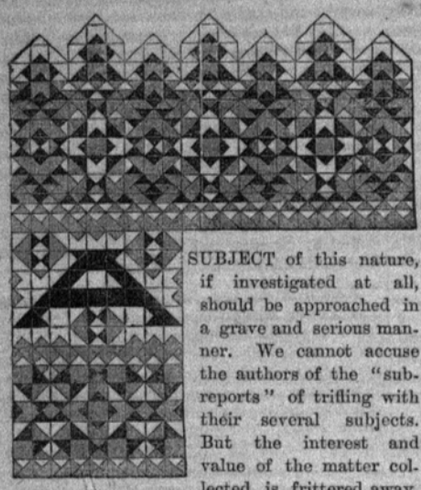
Pre-historic Relics in Cumberland.—At the last ordinary meeting of the Manchester Literary and Philosophical Society, Mr. R. D. Darbishire, F.G.S., gave an account of a remarkable discovery of pre-historic relics in Edenside or Gibb Tarn, near Braystanes Station, St. Bees, Cumberland. The find is a remarkable one, and is said to be, so far, unique in England, affording apparently a characteristic instance of the forest moss-pits. A watchful observation had failed, so far, to detect any traces of piles or platforms, such as indicate what are known as lake dwellings. Mr. Darbishire exhibited and described a series of celts, more or less highly finished; certain very interesting specimens of wooden hafts for celts, clubs, and paddles; a quern, and several remarkable grinding-stones of different forms; and fragments of rude earthenware, found by Mr. Pinhorn, Mr. Quayle, and himself.

The Inventors' Institute.—A paper on "Inventions and Patents connected with Buildings," by Mr. Banister Fletcher, will be read this Thursday evening, the 4th of January.

The Builder.

VOL. XXX.—No. 1510.

*The Coal Question a Serious Subject.**



A SUBJECT of this nature, if investigated at all, should be approached in a grave and serious manner. We cannot accuse the authors of the "sub-reports" of trifling with their several subjects. But the interest and value of the matter collected, is frittered away, instead of being augmented, by each succeeding distillation; until in the ultimate Report of the Commissioners, which is that to which the public look, it becomes absolutely *nil*; or, in fact, assumes a negative value, as tending to show that nothing sensible can be said on the matter. Now it so happens that Professor Jevons published his work "On the Coal Question" in 1865, and that he there gave an estimate of the consumption in 1871, which has been almost exactly verified. Here, then, is a statistical expectation, which certainly deserves much more respectful treatment than to be put on all-fours with the optimist speculations which we have just dissected. Indeed, when it is borne in mind that, while the general population of Great Britain may be roughly said to double itself in a century, the population of the larger towns, the great consumers of coal, tends to double itself in less than half that period, it would seem as if the most probable error of Mr. Jevons would be in defect, rather than in excess. In support of this view it should be remarked that the returns for the ten years from 1859 to 1869 show a rate of increase much nearer to 4 per cent. than to the 3½ per cent. taken by Mr. Jevons.

In face of the protest of Sir Roderick Murchison, we must treat the question of the existence of workable coal, beneath the cretaceous and other secondary rocks in the South of England, as one which it is impossible, at present, seriously to discuss. The most salient points, therefore, which we consider that a competent reporter would have elicited, from the inquiries and evidence brought before us, are these.

The deepest colliery in England has a shaft of the depth of 2,376 ft., which is still being sunk. From the depth of 1,800 ft., to that of 2,376 ft., the increase of temperature becomes more rapid than is the case in the first 1,800 ft. The temperature of the earth, in this shaft, at the depth of 2,376 ft., is 92° Fahr., or 4° higher than that which would result from the *data* relied on by the Commissioners, but within 1° of the rate which we have ourselves adopted. At a depth of 2,706 ft. (neglecting the disparity of increase above shown to exist), the coal in this pit would become unworkable, without some as yet uninvented aid to the respiration of the miners.

Some of the Belgian coal-mines are stated to be carried deeper than any in Great Britain. At *La Mouille longe*, a boring was continued for four years, from 1853 to 1857; and the enormous depth of 920 mètres (or 3,017 ft.) was arrived at, without passing out of the coal measures. The Commission has not thought it worth while to seek for the practical test to which their theories might be put, by ascertaining the facts of the Belgian mines. The rate of increase of temperature indicated by this boring, is considerably higher than were the highest assumed from English *data*, and a variation in the rate, at increased depths, also results from the experiments.

In the Monkwearmouth Colliery, at a depth of 1,640 ft. from the surface, the physical powers of the miners begin to flag at a temperature of some 80° Fahr. Medical evidence is not required by those who are familar with the effect of the summer heat of Egypt, of Algiers, or even of Italy, Portugal, Spain, and the South of France, on the English constitution, to inform them that the rise of every single degree above 84°, is accompanied by a sensible loss of the power of exertion. This temperature may be expected at the depth of 1,920 ft., and with every additional nine or ten fathoms, additional difficulty, exhaustion, and consequent cost are experienced by the miners.

It results from this view, that our national anticipation of a successful winning of our coal, at a depth much exceeding 2,700 ft. must depend on the result of a method to which the Commissioners have alluded, without seeming to be at all aware of its crucial importance. It is to the introduction of pneumatic machinery, that we are indebted for the completion of the Mont Cenis tunnel; not only on account of the mechanical advantage thus obtained, but also in virtue of the effect on the air of the tunnel, produced by the constant escape of the compound air that is forced in to work the machines. Mr. Lindsay Wood gives evidence that the air escapes from coal-cutting machines at a temperature of 7° Fahr. below freezing. But if, by the employment of such machines, or even by the introduction of special pneumatic arrangements for the purpose, the air would be so reduced in temperature as greatly to extend the zone of depth penetrable by the miner, all mines infested by fire-damp, or choke-damp, would be excluded from a benefit inconsistent with that voluminous ventilation, which alone can adequately dilate, and sweep away, the fatal gases. It is characteristic of the Report that it does not refer to this most important question. The "Sub-report of Committee A" contains a brief paragraph on the subject. The value of the collateral evidence obtainable at Mont Cenis, does not seem to have occurred to any of the reporters.

The only condition, therefore, from which we can at present calculate, with any practical wisdom, on the productive working of our collieries at a depth beyond 2,000 ft., is that of an adequate supply of air of a lower temperature. It would be possible, even in the summer, to deliver a ventilating current of a temperature little, if any, above 50° Fahr. at the entrance of the galleries at a considerable depth. But the deeper the shaft, the longer, on economical grounds, must be the working galleries, and the more will the temperature of the ventilating current be raised, by passage through the mines. This rise in temperature, which is somewhat unintelligibly alluded to in the Report, appears to be directly as the length of gallery passed, whatever be the volume of the current. It is rapid, of course, in proportion to the differences of the temperatures of the earth and the current, but is comparatively unaffected by the velocity of the latter; but any attempt to lower the temperature of a mine, by giving double rapidity to the ventilation, while it requires eight times the power, produces but inconsiderable results. In Rosebridge Colliery, a column of air was raised 19·5° Fahr. in a course of 3,140 yards. The earth temperature here is only 80° Fahr. The results of such a length of passage, through galleries of 10 or 15 degrees higher temperature, would be far more marked and unmanageable.

Without undergoing the labour of remodelling details, on a plan which the Commissioners ought themselves to have regarded at least as an alternative, we are yet in a position now to state that the available quantity of coal on which we can, with any prudence, depend, must be very far less than the 146,480 millions of tons which the Report states "may be reasonably expected to be available for use." Instead of calculating the contents of a zone of 4,000 ft. in depth, we see that we are only justified in expecting to penetrate (with our present experience, and at anything like our present cost) to a depth of some 2,700 ft.; which is 324 ft. deeper than our present deepest shaft. At, or even above, this depth, the soil is of the heat of the blood; and the rapid heating of the air, according to our present best methods of ventilation, would be such as to render workings, of a length at all proportionate to the expense of the shaft, quite intolerable for human labour. Besides the 13-40ths thus to be deducted, a further allowance, undefined but considerable, must be made for poor coal, and for seams above 12 in. in thickness, but too thin to be profitably worked at a great depth. Thus, for instance, in the Somersetshire coal-fields, the total thickness of coal in forty-six seams is only 98 ft. 4 in.; giving an average of 2·13 ft. for a seam. In the Golden Valley collieries, a depth of 1,920 ft. has been reached, and the cost of bringing the coal to the bank is said to be about 8s. per ton. It is thus clear that an effort to win coal from a considerably greater depth, out of the 6,000 ft. or 7,000 ft. of which these coal measures consist, is likely to be counterated by commercial considerations. The modest term of 4,219 years for which this district will be able, in Mr. Prestwick's opinion, to maintain a yield equal to its present product, thus becomes a vanishing quantity. No engineer, with all the latitude of estimate with which the profession are sometimes reproached, could be justified, on the evidence adduced, in making the probable quantity of available coal, in the coal-fields of the United Kingdom, reach the amount of 100,000 millions of tons. The 110 years which Professor Jevons allows for final exhaustion must be, in common prudence, proportionately diminished in duration.

The check upon consumption that will be effected by a rise in price, is another of those essential elements of the question which are ignored by the Report. But for a hint on page xviii, it would seem as if the Commissioners were not aware that such a commercial question had any existence. This hint only makes the neglect still more glaring. There are many reasons to lead us to expect an immediate increase in the price of coal. To say nothing of the nominal increase, due to the steady influx of gold, we may remark, on the one hand, the uneasy feeling among the coal-miners, and, on the other, the mode in which winning is becoming more costly and hazardous, in such cases as those of the Golden Valley and the Monkwearmouth collieries. Whatever be the reason, there can be no doubt that the Commissioners, to use their own language in a note that forms an awkward comment on the text, "are taking the most favourable view in reference to deep working that the evidence will possibly allow" (p. 82). In fact, the idea of the propriety of that course of action on which Committee D (p. 118) so *naïvely* plume themselves that they "have done all in their power to allay the fears of those who have thought that the national supplies of fuel must terminate," appears to have been the real motive of the Report.

* See p. 2, *ante*.

Such a mode of dealing with the subject is neither creditable, wise, nor honest. Great expense has been incurred, five years of time have been consumed, a mass of evidence has been collected, and the Houses of Parliament are presented with a report which blinks the main points, is either an absolute nullity, or is inconsistent with the evidence, and which acknowledges, in a note in small print, that its starting-point is contrary to experience. Showing us that coal cannot at present be economically worked at a greater depth than 2,700 ft., and that no mine in this country is worked within 324 ft. of that depth, it assumes a workable zone of 4,000 ft. in depth! It places in contradiction to its conclusions, the opinion of our highest authority, himself a member of the Commission. It neglects altogether the evidence which is attainable in Belgium, and in the Alps, on some of the most important physical questions that affect the subject. It ignores the commercial question, the very bones of the matter, altogether. It tries to make things pleasant to the public; and it does so with a feebleness of utterance which it takes fifteen men to attain. No single writer would have had the courage to take the responsibility of such a report; no professional member of the Commission, if the matter had been left in his hands, but would have given us more reliable advice. The vice of referring such a matter to a numerous committee, presided over by a Cabinet minister, who has not the experience, and who ought not to have the time, to deal with the subject, is illustrated to the utmost. The opportunity of drawing up what would not only have been a State paper of the first class, but something more,—a permanent chapter in the physical, industrial, and commercial history of mankind,—has been frittered away. We are presented, under a high-sounding title, with a result neither reputable nor reliable, and we cannot repress the feelings of humiliation, and of disappointment.

PUBLIC IMPROVEMENTS IN PARIS AND LONDON.

SIR JAMES PENNETHORNE.

AT a meeting of the Royal Institute of Architects, on the 18th ult., Mr. Arthur Cates read an interesting and valuable Biographical Notice of the late Sir James Pennethorne, which necessarily included reference to the numerous schemes for the improvement of the metropolis with which the subject of the memoir had been connected, and produced a discussion that may be usefully reported.

In 1832, said Mr. Cates, Mr. Pennethorne was, in consequence of the experience gained by his connexion with Mr. Nash, employed by the Commissioners of Woods, and commenced to devote his attention to devising plans for the improvement of the metropolis. The great works which had been carried out under the inspiration of Mr. Nash, and by which the West end of London had been in fact created, were completed. The source from which the funds, lavishly but wisely expended, had been derived, was no longer available; and a Select Committee of the House of Commons having, in 1838, approved and recommended for adoption the plans submitted by Mr. Pennethorne for metropolitan improvements, he was (with Mr. Chawner) appointed to carry them out,—not, however, as designed by him, but trimmed and pared down to satisfy the requirements of economy; and although the four streets authorised by the Act 3 & 4 Vict., cap. 87,—viz., New Oxford-street, Endell-street, New Coventry-street, and Commercial-street, Spitalfields,—have proved of the utmost service to the circulation of the traffic of the metropolis, it is now certain that could his enlightened views have prevailed over the narrow spirit which influenced the decision on his plans, the metropolis would not only have been greatly benefited, but improvements greatly needed, and now rendered almost impracticable, would have been carried out at moderate cost. Until the formation of the Metropolitan Board of Works (1855), he was constantly engaged in devising schemes for improvements, which were, more or less advanced, some even having been brought into Parliament; but all general projects fell through from the difficulty of providing the necessary funds, a difficulty which is now removed. Besides the formation of the new streets, and other improvements, such as those at Pimlico, Kensington Palace Gardens, Windsor High-street, &c., he carried out Victoria Park, Kennington Park, and Battersea Park; the works of the latter, after many years of delay, having been hurried on in a manner which prevented the complete realisation of his design. The scheme for a northern park, which in 1852 was proposed to be formed under the name of Albert Park, was fully worked out by him; and had funds been available, and the project realised, would have added largely to his reputation as a landscape gardener.

In the course of the discussion which followed, Mr. Edward Hall, visitor, said,—I wish particularly to direct further attention to the difficulties in which Mr. Pennethorne was constantly placed in treating Government works. During the whole time those works were under consideration, or were being carried into effect, he was thwarted in a manner which one could hardly conceive without close study of the subject, such as, I may say, I have myself given it. You will find some of the results of those difficulties in the line of Bow-street and Endell-street, and in that of which Coventry-street and Long-acre were to form part. If those lines had been carried out as Mr. Pennethorne designed them, we should not have had that corner which there is, where Coventry-street joins New Coventry-street, where stands the restaurant called the "Cremorne Branch," jutting out and interfering with the direct route of the traffic. We should have had a broader route, and there would not have been the danger that there is on every opera night, in Coventry-street. Nor would there have been the projection of the corner of Drury-lane and Great Queen-street. We should have had a tolerably straight line, taking in Coventry-street, Long-acre, and Great Queen-street, without the present twisted junctions. The actual defective arrangements were owing to the excessive anxiety for diminution of expense, and to the absence, in Mr. Pennethorne's superiors, of his forethought as to future requirements, and his judgment as to modes of proceeding. Thus, only one side of what is now Endell-street was dealt with; and the other side remained as inferior property, whilst there were formed the awkward turns at the north and south ends of the street, instead of the line being made straight from Wellington-street to Bloomsbury-street. But it will surprise those who have not paid attention to the history of this subject, to be told that it was argued by recognised authorities in these matters, that a crooked line was better than a straight one. It was maintained by Mr. Higgins, a surveyor of the day of some eminence, that it was much better that the traffic should take a turn in the case of any crossing of streets than that it should cross at right angles. The consequence was that the suggestions of Mr. Higgins and of Mr. Richard Lambert Jones, the latter a great man in the City in those days, were preferred to those of Mr. Pennethorne; and it was also owing to their influence that Middle-row, Holborn, was allowed to remain so many years as it was.

Professor Kerr.—We lost in the late Sir J. Pennethorne a man of special ability and special education, who seems to have devoted his lifetime,—and that apart altogether from considerations of specific employment,—to the great question of the improvement of the metropolis, and not merely its improvement in the sense in which the phrase is generally used,—such as merely cutting a new street through a back slum, and making a new line of thoroughfare,—but, as far as he dared, the architecturesque improvement of the metropolis generally, which is a consideration of so much importance in London, as compared, for example, with Paris. There is a question which I have often heard asked, but have never yet heard properly answered, viz.:—Why is it we in London find it utterly impossible to do as the Parisians have done with regard to their streets? We are richer than they. We have greater necessities with regard to traffic. The property affected, I have been told on the best authority, is not, as many of us may have supposed, more valuable than theirs. And yet we find they are able to cut straight lines in the precise direction in which they are felt to be desirable, and so to form grand thoroughfares through Paris in all quarters; and though it may be the fact that embarrassment has ensued, yet there is no appearance, even in this the darkest day Paris and France have ever seen, of the dreaded result of an actual crisis. I have always felt disposed to consider that money laid out in the improvements of a metropolis is money well invested for the people. True, it may not bring a direct return in the shape of a money profit, but it brings profit in many an indirect way, which makes the outlay what is called a successful investment; and I think it is a pity our financiers and public men of business are so unwilling to take that view of the question. When a common tradesman builds new premises, or puts a new shop-front into his house, he does not expect to get a direct return for it in money. He makes his place more attractive and convenient, and he knows that his business will improve in various unexpected ways as the consequence; so that he makes it answer on strictly businesslike and financial grounds. In the same way I contend the public of the country, looked upon as a community in business, will find it a judicious investment, and not a mere waste of money, to pursue the architectural improvement of those great centres—and particularly London—in which business is carried on. By recent arrangements, as we know, the future improvements of London—at least, in their purely utilitarian bearing—are to be a portion of the operations of the Metropolitan Board of Works. The question, however, arises—who is to take the initiative in those projects which such a Board can scarcely be expected to initiate. Our First Commissioners of Works, we architects may be excused for suggesting, are in this view of the case of no use whatever. It is notorious that our First Commissioners, one after another, have been mere politicians, who, having what is called a claim upon office, have been put into that particular position to work their way up, if possible, to some higher post in the scale of dignity. I humbly submit that is not the best way in which to deal with the architecture of London, or with the outlay of the public money, in any kind of building; and I think it may possibly be ultimately found to be necessary—I hope it may—to have something like a proper and responsible professional authority in connexion with the Government and Parliament, which shall take into consideration all questions of the kind; and especially those which affect Government property, and the great thoroughfares in which the Government buildings are situated, as in the case of the Whitehall quarter; and I venture to say it is impossible to accomplish anything upon a dignified scale, unless there is some such agency provided to initiate intelligent proposals with something like authority. I must say the Metropolitan Board, so far as it has gone, in street improvements, has succeeded to a greater extent than many of us supposed possible a few years ago. I think we must all agree that that body deserves especial credit for success in respect of the several grand lines of thoroughfare, which have recently been opened. But I think there are some things which the Metropolitan Board cannot be expected to do—which the Government must do if they are to be done at all; and the question is a most important one,—how the initiatory steps are to be taken, now that the office of Government architect is swept away. I do not see in the policy of the present First Commissioner, or in the new machinery of the Office of Works, anything approximating to such an agency as would serve to initiate public works in an efficient manner.

Mr. G. Herbert West.—I would remark, in reference to the observations that have fallen from the last speaker, that in my opinion the different conditions in the laying out of new streets in London and Paris arise not so much from differences in the cities themselves as in the Government and the nature of the people. In this country we can never expect to have an autocracy such as that under which Baron Haussmann carried out the improvements of Paris on so grand and gigantic a scale, being seconded by an irresistible law of expropriation, which served more especially to make the fortunes of many who were engaged under it. The first plans carried out were those for streets which were not designed by M. Haussmann, but which were decided upon under the rule of Louis Philippe and the Republic. The plans were divided into three sets or networks, which we might characterise as the really desirable, the useful, and the extravagant. The first, which had been decided on before 1859, comprised the Central Markets, the Boulevard Sebastopol, the Rue de Rivoli, and the opening up of the city. The second, decided on in 1859, included the Boulevards Prince Eugène, Château d'Eau, and Malesherbes, &c., Pont de l'Alma, Avenue Marbeuf, &c., Rues de Rome, de Lafayette, &c., the Parc Monceaux, and the Bois de Boulogne and Vincennes. The third network comprehended all the streets round the New Opera, *i.e.*, the Rues Halecy, Auber, Scribe,

Chateaudun, Quatre Septembre, &c., Boulevard Haussmann, &c., and on the left bank, the Boulevard St. Germain, and the Rues de Rennes, Guy Lussac, Monge, &c. The first set cost 272 millions of francs, the second 410, the third 615. Total, 1,297,000,000 francs, equal to 51,880,000*l*. Before the Boulevard Sebastopol was undertaken, there had been great discussion as to whether the existing streets, St. Denis and St. Martin, should be widened by buying up the houses and setting them back—whether an entirely new thoroughfare should be made. In 1859, partly perhaps for military reasons, the preference was given to the new boulevard. It was argued that interference with existing thoroughfares did more harm than good, and damaged trade, and that it was better to buy up houses in the back slums between two great streets, and drive a new boulevard through them. The difference in the nature of the traffic of the two cities is such that in London you cannot drive streets at haphazard through old quarters of the town and be sure of their bringing in a profit upon the outlay. In Paris, if they form a new street in which the ground-floors of the houses are shops, as is almost invariably the case, they are sure to meet with occupiers, and the upper floors will let in flats. So there is sure to be a good return on the money spent. But if you were to drive a new street through Drury-lane, you may be quite certain no one would live there; shop-keepers would not take the shops, and the houses would not let in flats, or as respectable lodgings, but the street would remain as poor as before. In Paris the tradesman occupies the shop and the rooms behind it, or at the top of the house, and in intermediate portions you have all sorts of people living, from the most wealthy to the poorest; and you are sure to have a traffic through the street, for Paris is a round city, while London is a long city. Our great avenues of traffic are by Oxford-street and the Strand; that in the other streets goes in no particular direction, but in Paris wherever you drive a new street you are sure to have traffic through it, since it forms one of the radii of a circle. This is clearly seen in comparing the omnibus maps of Paris with those of London. When a railway was proposed for Paris similar to our own Metropolitan Railway, it was objected to because the traffic was not sufficiently definite in its direction for it to be likely to prove of real service. In London you may have passage streets, but nothing more, however good the houses may be. In Paris you are certain to have a street more or less of palaces: some of the streets are very well inhabited, and all more or less bringing in good rents, and you cannot make sure of that in London. Since the Government have taken up the system of renouncing the employment of architects, you cannot have men in London corresponding to Baron Haussmann, or the present préfect of the Seine, with a body of architects working under him. In short, the differences of conditions are so great that you cannot fairly compare the two cities.

Mr. Eastlake.—What is the difference in rents?

Mr. West.—Enormously higher in Paris. There is one street built in the time of Louis Philippe upon the London principle, of setting back existing houses, I mean the Rue Rambuteau, which runs through the old part of Paris. The Boulevard St. Michel was certain to be a great line of traffic. The Boulevard Haussmann is perhaps the only great street without shops which could be compared with our streets of private houses. It is only half finished, and other streets have been left in such a state of incompletion that you cannot take them into account. The Boulevard St. Germain has been begun at both ends and in the middle, but left unfinished, because it will require twelve millions of francs to buy up the École de Médecine to complete it. Some of those streets may be gone on with, but I should scarcely think M. Thiers will finish the streets round the New Opera.

Mr. Hall.—The real reason why in Paris the improvements are, as in my opinion, so much more successful than in London, is that in the former city there is preliminary design or *plan*. That is to say, there is general plan and principle observed, dealing with the whole of the French metropolis. In London there has been no general plan; for even Mr. Pennethorne's plans were only applicable to a small portion of the area of the metropolis, not to repeat mention of the fact that they were made under the greatest disadvantages. The principle in Paris has been that which was observed by Wren in making his well-known plan for the improvement of the city. The principle in each case was this:—Decide what shall be your centres, and then form main lines to and from them, and direct lines. Every capital city has three or four main centres, such as a commercial centre, a centre of pleasure, a fashionable centre, and a centre of government; and it is necessary to decide upon these or to treat these as having been decided before you arrange your main lines. In Paris, pleasure is of greater importance than it is in London. Therefore, having decided to remove the Opera House, it was a main point to make routes converging to the place fixed upon as the site of the New Opera. I disagree with the last speaker in what he said with regard to the utility or non-utility of the streets round the Grand Opera. I think those streets have been well devised. I may mention, for example, the Rue Lafayette. Any one looking at the plan of Paris will see that the principle adopted by Wren has been carried out, though for the whole metropolis and suburbs, instead of the design being confined to one portion of the metropolis. I agree with the gentleman that some of the recent improvements of Paris are almost extravagances. No doubt a great deal has been done to keep the population employed. Still there is in Paris, I believe, a much greater return for the expenditure than people here are in the habit of supposing; and I am inclined to think when there is supposed to be a difficulty in getting occupation for buildings in new streets in London, it is forgotten that a part of the general demand of the present day for places of residence is one for residences for the middle and "lower middle" classes; but in too many cases we erect comfortless buildings, badly planned and ill-constructed by speculative builders, and there is no inducement to occupy them. People have been driven to reside in the suburbs; but there is a growing feeling of disadvantages which attend suburban residence. If we had properly planned buildings in properly planned streets, no doubt they would be occupied; and the improvements would give that return on the investment to which Professor Kerr has so well alluded.

Mr. R. Phené Spiers said:—As far as our experience has yet gone, there seems to be a decided distaste on the part of the English public to living in flats. There are some in Victoria-street, and though they have been built twelve or fourteen years, I am not aware that there has been such a demand for that kind of lodging as to call for a fresh supply. I can bear out what Mr. West says as to the facility with which shops and apartments in new streets in Paris are taken possession of. On the appearance of a new street, with the road hardly finished, and while the street itself is not much known, it is natural to suppose that the shops would only be taken by an inferior set of shopkeepers, who commence business somewhat in the way of the American stores, but it will be found that, after the lapse of two or three years, the shops are tenanted by respectable tradesmen; much money is laid out on them, and they form an additional attraction to the fine architecture of the street which has been opened. The rents of these flats far exceed the rent of our houses in London, even in the suburbs of Paris. In the outside of the outer line of Boulevards, a suite of five or six rooms on the third or fourth floor cost more than a twelve or fourteen-roomed house in the centre of London; and when you come to the Boulevard St. Michel and Boulevard Strasbourg, the prices obtained are immense. To a certain extent we may set against that the expenses which Londoners incur by living in the suburbs, in going to and from town daily. Some live at distances which cause an additional expense of 20*l*. or 30*l*. a year in railway or cab fares, and that does not include the family travelling expenses; and if these are added to the rent of the house in the suburbs of London, it would bring it up to about the same price as is obtained for the flats in Paris. The French have been accustomed to be satisfied with a much smaller quantity of everything than we are. They use very little water, and believing that they can wash themselves with the corner of a wet towel, they do not see the necessity for a bath; and the same with regard to food and everything. The rooms are only just as large as is necessary. They have not large families, or it would be difficult to understand how they could manage with such small accommodation. As a rule, these flats contain not more than a quarter the space which there is in our English houses.

Mr. E. R. Robson, Fellow.—In reply to the inquiry why it is that in London we cannot carry out public improvements on the same comprehensive scale as has been done in Paris,—it may be remarked that in this country we are subject to the provisions of the Lands Clauses Consolidation Act of 1845, which are applicable in all cases of public works and improvements, just as in the case of railways. The result is that in the case of opening out new streets you cannot obtain just the amount of property which you require, and no more, if there is any objection on the part of the owner. What has been done in the way of improvements in London has been done on a pottering though expensive scale. In Paris they have a fixed tribunal to which all cases of purchases are referred; but under the Lands Clauses Act such a thing as taking the exact quantity of land you want is impossible. Two points have been stated with regard to the laying out of streets: one is, that an absolutely straight line is best. For my own part, I think that is questionable. In my opinion, where the bulk of the traffic is of a heavy description, a slight *détour* is preferable to crossing streets at right angles. In Paris there is more light traffic than heavy. In making straight lines of streets we reduce the thing to the point of convenience, and art is nowhere. Take the case of St. Martin's Church: convenience would ignore such a thing, standing, as it does, partly across the line of St. Martin's-lane, but art did not. I do not myself hold with the notion that all new streets should be strictly straight lines. In Paris we find that every straight street requires an ornamental column at the end, and it is the column which is seen rather than the architecture of the street.

Mr. Arthur Cates, in replying, said,—I am not surprised that the discussion should have taken the course it has. The contrast, vast as it is, between the public works of Paris and those of London is naturally a subject of great importance; but those who have spoken in terms of regret at the difference beween what has been done here and on the other side of the Channel have forgotten one element. They have spoken almost as if this country was deficient in designers of taste and art. I protest that, while our rulers or those who have the control of these matters may be deficient in these points, there are plenty of men available who are competent to the task. The one great thing wanting has been funds, and in that respect London has been placed in a position different from Paris. Those who have not studied the map of London of 1805 can have no idea of the mass of tortuous lanes and miserable dens that have been swept away, where now we have valuable property, and some of the most important districts of the metropolis. The great work carried out by Nash which converted the narrow and tortuous lanes around Old Swallow-street into the present noble thoroughfare of Regent-street, and the great improvements round St. Martin's Church, Pall Mall East, West Strand, &c., were carried out at the expense of the State; and it having been decided that the land revenues of the Crown, from which the funds had been so wisely provided, should no longer be used for such purposes, the further progress of such works was suspended. I have indicated in my paper the manner in which it was desired to continue those improvements, but the only funds at disposal for the purpose were those arising from the coal duties, &c. For the works already executed, those dues were mortgaged for years, and further sums were obtained by further mortgage of those imposts. The funds thus raised were soon exhausted, and there were no means of raising other moneys. The policy of the Government had been to keep London in a state of helpless infancy, cut up into little districts, ruled as regards parochial interests by vestries, but without the power of combination and joint action, which alone could lead to the execution of works worthy of the metropolis. The constitution of the Metropolitan Board was a very great advance on this state of things. That Board in time acquired power to use money by taxation, and we have seen the result of this control of funds, in the construction of new streets, projected many years ago, and the formation of the Embankment, which is a work equal to anything in Paris or any other city. We may assume that if London had been favoured with the means of raising money that existed in Paris, we should have had works which, if not equal in brilliancy, would have been equal in utility to anything in Paris. Paris has been more fortunate; the octroi, a ready means of

raising funds, was in full operation. At the end of 1852, the loans raised by way of annuity to meet the expenses of the occupation of the city by the allied armies in 1815 expired; but in place of the agitation which would have here arisen, to reduce the taxation, and sacrifice the great interests of the City to a paltry gain for the present time, the wise administrators pledged those duties for further terms, and by the fund so raised and further loans, based on the credit of the municipal revenue, commenced those great works to which allusion has been made. It was the large sums thus raised which gave the first impetus to the improvements carried out by Baron Haussmann. Then, again, in France the State generally acknowledges its obligations to the capital, by contributing one-third, more or less, to the improvements carried out, which affects localities in which the State and the whole country are interested. Thus the works around the Palais Royal and the east side of the Louvre were constructed by the aid of large contributions from the State. If you compare the two cities, you must do so on the same *basis*, and London will then hardly stand to disadvantage.

"INVENTIONS AND PATENTS CONNECTED WITH BUILDING."

THIS was the subject of a paper read at a meeting of the Inventors' Institute, on the 4th, by Mr. B. Fletcher; Sir A. Brady presiding.

Mr. Fletcher said,—I shall first take the entire *building* and work, thence to *details*. Probably I proceed in this form, as it is the usual course pursued in designing buildings, bearing in mind, too, the injunction by the poet,—

> "Consider what you undertake,
> And analyse it well;
> And ever work from *whole* to *part*,—
> Grand principle of *master* art,—
> That makes that work to tell."

Well, in what does the house of to-day differ from the house built 100 years ago. I must be understood to mean the usual houses which are being built all over the kingdom, and not as alluding to an exceptional house here or there.

It is wise to imitate the prudent tradesmen who just now are "stock-taking;" and I am afraid, if we take stock, and look upon the houses of to-day and those built some 100 years ago, like that I live in, we must say not merely that our predecessors built much stronger and better houses than we do, but also that the inventions and patents (grand as they are) have been so little utilised by builders, that even in conveniences the old houses will almost equal the modern. It is strange that this should be so, if one considers the almost appalling number of inventions and patents that yearly are granted. Take, for instance, this country, and the average number per annum during the last ten years: a little over 3,000 applications were made, and of these more than 2,000 were granted. The number applied for last year was 3,500, and of these, according to the average, two-thirds would be granted. Now see how slow Old England is. In the United States, for the year ending the 30th of September, 1871, 19,429 applications for patents were filed in the Patent Office (including re-issues and designs), and as many as 12,950 patents were issued. Yet again, startling as this is, we find that this number was not so great as that of the preceding year. I notice the fees received during the year by the United States Patent Office amounted to 671,583*l.*!

I cannot say what proportion of patents relate to buildings; but one sees from time to time in our professional papers a long list of such patents; so that, no doubt, the thought must arise in the mind of the public: why, then, are not these inventions and patents more used?

I will explain. A man, if he can invent something which will enable him to produce cotton ½d. per pound cheaper, or some machine which shall be a perfect substitute for hand labour in some department where the demand is unlimited, may out of such single invention amass a great fortune. The one condition of such success is that the article manufactured shall be in great demand, and that his invention has saved money in its production, or that he shall produce a better article at the old price, or that by his invention useless materials may be made available (for example, much iron is now used by the application of the *hot blast* that formerly was thrown away: I do not say to the improvement of the iron, but that formerly it could not be used at all). Now, you will notice in all cases the basis of large profit is from extended demand for the article. It is therefore evident that an inventor who turns his attention to patents in connexion with manufactures, has the prospect, if he succeeds, of larger profit than he who devotes himself exclusively to patents connected with buildings. This may account in some measure for the relative small proportion of inventions relating to building.

Having, then, shown that the inventive genius is somewhat allured from building-patents by the temptation of larger gains, a few words will be well to indicate the difficulties that beset those who, having devoted their time to this class of patents, succeed in producing a valuable and useful one. The architect who is building a house probably goes to see the invention,—likes it,—thinks he will try it,—hesitates,—finally probably decides against its employment, from fear that it may not be successful. Yet, I think, little blame can attach to him: if the invention succeeds, the merit is the inventor's; if it fails, all the blame falls on him, for selecting such a "fandangle, stupid thing:" such will be the language his client may use to him. He therefore has no inducement to recommend a novelty, as it cannot benefit him in his practice, and by so doing he may lose a client. Is it, then, to be wondered at that we are so conservative in our decisions?

Qui bono, you may ask, all this explanation if there is no remedy? Well, I have a remedy. It is the formation of a commission, with unpaid members, who should inquire into patents or inventions, when (and not till then) the results are being manufactured for sale, and should test them, and should also invite the opinion of all who use them; and these commissioners from time to time should report the result of their investigations. I would base their operations very much on the mode of proceeding adopted by the commissioners of the *Lancet*; and I think my hearers will agree with me, these commissioners have done much good. I feel sure that the commissioners I propose would be of great service if the gentlemen were carefully selected.

I have said that houses now are built very much as they were years ago. Go into any ordinary house in any of the suburbs of London, and what difference will you find? Why, the house is as nearly as possible a counterpart of any old house, except that it is not so strongly built. Shutters are gone, and perhaps instead of the sash bars (which, by-the-bye, some architects are now putting in their new works), a large square of plate-glass. In fact, the house when ready for letting usually has not *one* of the modern appliances.

This being so, let us consider what a house should be.

It should first have a good damp course, to prevent damp arising. Every room should have an air-flue to let the foul air escape, and those rooms where gas is burnt should also be provided with an external ventilator. The pipes from closets should be carried up in an inside recess, to prevent frost, and should be accessible by merely opening the wooden covering. The bells should also be so carried up. There should be a hydraulic lift where the house is large. Water, hot and cold, should be on the bedroom floors, and in the lavatories attached to the water-closets. Where cupboards are put, they should be fitted having regard to the use they will be put to. For instance: in bedrooms, they may be made like wardrobes. To see what is being done out of this country, look at the Americans. Take one of their houses: not a servant (or help, as I should perhaps call them) wanted upstairs, every room always ready except the dusting; the bed, a spring mattress (no making required); a tap to regulate the temperature of the room; washstand, with hot and cold water laid thereto, and waste therefrom; so that positively while we are quite helpless without our domestic servants, they can do everything upstairs without servants. Surely the picture I have drawn shows how much we have to do before we can call the Englishman's castle really a *home* fit for this century. Well may I quote those lines,—

> "So hard
> The growth of what is excellent; so hard
> T'attain perfection in this nether world."

In proceeding to details, the lecturer compared granite and marble, mentioning that the price of the "dark shap" supplied at the Midland Railway Terminus was 3*l.* per foot run, for the columns, which are 2 ft. 8 in. in diameter, and advocated where slate was used for internal work it should not be in imitation of marbles, but should be in plain tints, relieved with gold and colours, some beautiful specimens of which were produced. He mentioned the various kinds of stone-preserving processes, but would not express any opinion as to their merits. The new Midland Railway Station is being treated with Professor Church's process, and also with that of Mr. Ransome; and he also considered the patent stone of the latter, specimens of which were produced, worked with the chisel. He touched on fireproof construction, mentioning the price, inclusive of rolled joists and concrete, of the Dennett system at 4*l.* 4s. to 5*l.* 5s. per square for "model houses," and 5*l.* 5s. to 6*l.* 10s. for ordinarily-sized houses. Many specimens of moulded bricks he explained, with the machine for making them. As to concrete building, this formed an important portion of the paper, and he took great pains in showing its advantages and disadvantages as compared with the ordinary building materials. He stated the former to be cheapness, strength, and durability, rapidity of construction, and economy of space; the latter its liability to failure from the use of improper materials, or from the want of knowledge and proper care, and the limits which the material and method impose on architectural design and decoration. He objected to the imitations he had seen of stone fronts by concrete, with core of that material to form mouldings, and facing it with Portland cement. Such a method, he considered, would soon bring concrete building into disrepute. There is little doubt that concrete building, so far from being necessarily a "sham," may be made an admirable and useful material capable of perfectly legitimate treatment with good results. The different kinds of apparatus used in the erection of concrete buildings were treated of. Amongst the peculiar features of concrete buildings was mentioned that with regard to steps; four of Portland stone pounded to one of cement were stated as the proportion. The cost of these steps is about half that of Portland stone. Seven to one is the usual proportion for general building, but four to one is used for coring out for mouldings, and two to one where the projection is very great. An advantage in regard to sanitary arrangement was mentioned, viz.:—that it will take any number of flues for any purposes anywhere; so solid is the material, that flues may come within 3 in. of outer face. All fitting into vertical grooves must be avoided, as the swelling of the cement prevents the lifting of the apparatus. The new shaped core to chimneys was explained, which obviates the necessity of making the chimneys tapering, and it was shown that this prevented a series of recesses to catch and hold the soot. In roofing, the thickness of concrete should be 4 in. to 6 in., with thereon 1 in. of asphalte. He next alluded to Messrs. Hayward's latest invention in pavement lights, including the hexagonal and half prismatic lights, also to the square half prismatic light for filling in existing pavement lights to increase their lighting power. He produced seven different samples of sash-fastenings, all to prevent opening from the outside, some being cheaper, and some more effective than that recommended by Colonel Henderson in his official circular. He considered it was want of information on the part of Colonel Henderson, and showed how the one he recommended could be opened from the outside if the sash did not fit very closely. Many examples of locks and their fastenings, door-springs, and rollers, water-bars, casement fastenings, revolving-shutters, electric bells and domestic telegraphs, cottage ovens, stoves, lifts and hoists, dust-shoot boxes, pipes, paints and enamels, &c., were exhibited and explained. An ingenious letter-box was also introduced. And he concluded his remarks with this observation,—"I think, however, there is a grand future for architecture, but it must be by striving to combine in buildings all the scientific inventions of the day, to do so continuously and with judgment; and herein new forms will be created by the use of new materials, if only the desire be present not to be slavishly bound by precedent, but earnestly to strive to make the requirements of science express themselves in our works. Whilst, therefore, I contend no architect should have or invent any patent, or have any interest in any, for the reason that he may be tempted to use it when some better thing may have been discovered (and this merely from the natural love we all have for the children of our brain), he should be ever willing to experiment with all the inventions of others, and thus give them aid. I have learnt much while perusing my investigations, and if I but lead others to investigate for themselves, I am confident they will also learn much."

The discussion was adjourned to February 1st.

THE LAW COURTS.

SIR,—If the people of England do not get a good building for the central Law-courts of the nation, it will certainly not be from want of public discussion; and yet, if a great national establishment can be designed by public discussion, like an Act of Parliament, it will be a new era in the history of architecture, and England will be the first country that has been able so to dispense with architectural genius.

If the multitude of critics, with the approbation of the public at large, can produce a work of art, then surely the architects who built the celebrated works of old have lived to little purpose; and again, if the works so produced are satisfactory, and "the people's architecture" is the best, it will still be a matter for curious investigation why the architectural art should be different from other arts in that respect. We do not get our pictures painted and our statues carved by public competition, nor is the poet laureate selected by a committee upon poems, still less should we think of inviting public opinion for suggesting improvements to the artist in the course of his work.

Now, it appears to me that this difference in our mode of dealing with architectural works, as compared with other arts, is possibly one of the chief causes why that art has fallen in this country into a lower rank, and why its productions have been unsatisfactory. I cannot see why the same course should not be pursued in architecture as in painting; namely, to select an artist, and then, having given him his instructions as to the general extent of the work, to leave him practically unfettered as to the manner of carrying them out. This notion will, I have no doubt, appear to many to be a rather startling innovation upon our habits in this respect. We have been accustomed to think that every man knows exactly what sort of a house he wants, and that a majority of a committee must be able to say what sort of a building is required for any public purpose. But I suspect the truth is, that the public have never sufficiently considered the subject to be able to separate the idea of the requirements of the business to be done in the house from the idea of the mode of providing for those requirements. What architect is there who has not received a letter from the intelligent house-proprietor about to build, showing exactly how the back staircase could be added on for next to nothing, or how a corner, 5 ft. square, with a gas stove in it, could be easily cut off from the hall for his own snuggery; and yet, who cannot or will not say what is the traffic or business to be provided for in any part of the house.

There are instances to be found in the public buildings of our own country (and, indeed, of other countries) of the effects of this kind of interference with the architectural artist upon the buildings themselves; but of the results to the artists, the withering of individual genius, and the growth of a mere desire to please the popular taste, little is known or felt.

It is just this hampering of the genius of the architect which I think has been the main cause of the difficulties and disappointments connected with the Law Courts buildings; and, as an evidence of it, I may quote the very award of the judges on the competitive plans. This was to the effect that, as no one architect had precisely fulfilled the conditions laid down by the commissioners, they therefore selected that plan which most nearly did so, and combined it with the elevation most pleasing to themselves, and thereupon presumed that the most efficient building would be produced.

Now, is that a system likely to promote the growth of that independent, true artistic spirit which Mr. Fergusson says can be produced, if the architects and the nation choose it? Is it not in itself an argument why architects should be content to run along the groove of popular opinion, and cease to hope for any originality of thought?

And yet the judges were only strictly carrying out the instructions under which they acted, which were to select the plan that, in their opinion best fulfilled the required conditions. It is to these conditions, therefore, that we must look for the fountain-head of the mistake. It is to these that I drew attention in a previous letter, which you were kind enough to publish in your periodical; and if you do not think the subject too much exhausted, I wish now to point out a little more in detail, what I consider to be the injurious effects of some of these upon all the designs for the law buildings.

The first and chief of them was, I think, the precise limitation of the area, both in extent and form. I will venture to say that for the business to be carried on there, and considering that it is acknowledged to be one of the largest collections of public buildings ever massed together, it was as small and as badly shaped a site as was ever appropriated to a public building. The area defined in the original instructions was about 900 ft. by 500 ft., the larger dimension lying approximately east and west. This is nearly the same as that occupied by the Houses of Parliament, but the latter is a long building of comparatively narrow depth, and with an open area about it, especially on the south side, which it faces. The Tuileries and Louvre together occupy a length of nearly 700 ft. by 300 ft. broad; but they face the south, and the interior is nearly one large square. The Escurial is one of the largest palaces in the world, being 650 ft. by 550 ft.; a great deal of the site is garden; it is in a sunny climate and isolated; whereas the site proposed for the Law Courts is shut in on all sides by private houses; and the number and character of the offices to occupy it is such, that the whole area must be covered as closely as can be done, and without regard to aspect.

All sanitary engineering is tending in the present day to the spreading of buildings in such directions and extent as shall insure the greatest amount of sun and air; and the absence of these two vital forces in any public building would, no doubt, be perceptible in the health and energy of the functionaries employed in them. Now, I consider it impossible that any architect can arrange the rooms required in the original instructions on that site, without having a great number of small courtyards into which the sun will rarely or never shine, and a great number of windows of rooms with a northern aspect. And why should it be so? If the nation wants a palace of justice in which to conduct one of the most important branches of its administration, why should not the nation ask an architect to define the space required for it, letting him take these sanitary questions into consideration, as well as the greater one of taking the opportunity of opening out a fresh lung in the metropolis; thus making the Law Courts an abode of cheerful light instead of one of damp and darkness. It is not the expense that would stop the nation, for that has never stopped it in doing what it considered to be right; and when we consider what the single towns of Belgium did to provide town-halls and cloth-halls, and what our own provincial towns are now doing for their public buildings, expense would hardly be an obstacle in a question of space for the Chief Courts of Law of the British empire. It would be better to secure the ground, and to postpone some of the buildings to a future generation.

The real difficulty is in the limitation which has been imposed, step by step, on each authority concerned: first, the Government fearful of debates; second, the Commissioners fearful of responsibility; third, the architects anxious to do something; and, fourth, the judges cabined and confined by the acts of the other three.

What, therefore, appears to be wanted to make the site a habitable one, in a sanitary point of view, is greater length east and west, so that the buildings can be arranged in such a manner as to allow the sun to penetrate at some time of the day into nearly every living-room.

The second important defective point which appears to me to be found in the instructions is the proposal to make a great hall the central feature of the whole mass. This idea originated, I have no doubt, from both administrative and æsthetic considerations. The lawyers felt that a central place, where everybody would be sure to find everybody else, would be an important saving of labour and anxiety to all concerned in the business to be daily carried on in these courts; and both lawyers and architects were taken by the idea of a grand feature forming a real as well as an æsthetic centre round which the whole mass could be grouped; and the architects, and especially Mr. Street, made the most of the idea, sacrificing certainly light and air, and in my opinion convenience and real æsthetic effect to it.

First, with regard to convenience. The law courts of England cannot be looked upon as one whole, like a palace or a State office, as far as their administration is concerned; they are only a collection of independent courts placed together for convenience of general intercourse. Each court or set of courts has its separate times and nature of traffic, and separate staff connected with it. And whatever the changes in the business of the courts relatively to each other, it is not probable that the independent character of each court will be ever much reduced.

The members of the legal profession naturally wish for the greatest possible facility for their passage from one court to another; while, on the other hand, for the orderly conduct of each court, it is desirable that they should be separated from each other. For a distinguished barrister, who has to make speeches in two courts within a few minutes of each other, they should be as close as possible; but it may be doubted whether the officers of the court or the suitors would be so desirous of proximity.

Then, again, each court has its peculiar wants in accommodation, and the concentration of them in close symmetry would interfere with such peculiarities at the outset, and with any little additions or alterations that might be hereafter required; and who will be bold enough to say that such will not be necessary in these days of change? For this reason alone ample space should be reserved round each court or set of courts.

Then, again, a great hall may be too great—for convenience in finding people. All the persons concerned in all the cases in all the courts would be mixed up together; and when they amount to some hundreds, a single room would probably not be so convenient as a long gallery, distinctly divided into compartments: the access to such a gallery from each court might be made easier than into one central hall, until the persons concerned with each court would be separated.

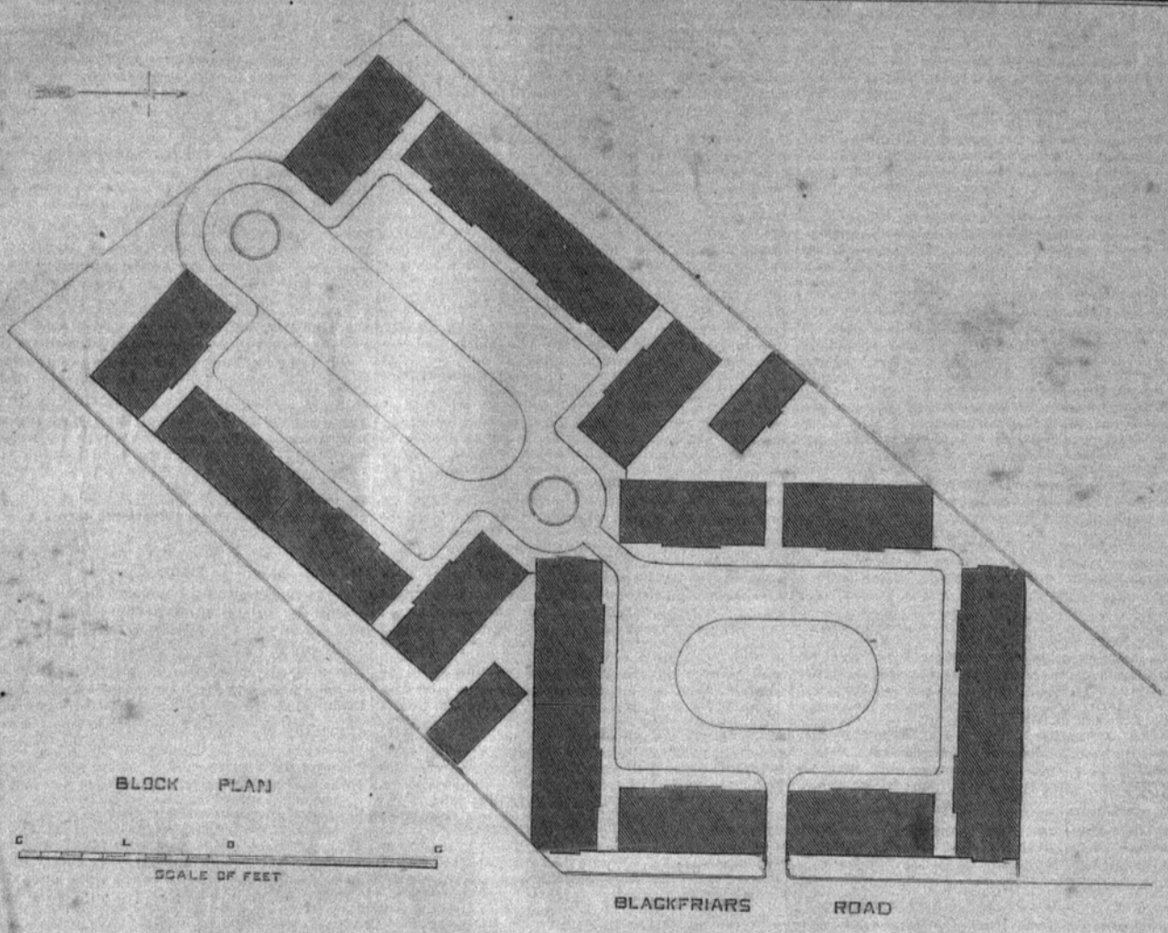
Lastly, concentration means an additional number of stories, and that means exclusion of light and air, and extra labour for the employés and the public.

Then, with regard to æsthetic effect. If I may venture, after the numerous and learned professional criticisms that have lately appeared in the public papers, to touch upon such delicate ground, I should say that the idea of a mass of building closely, concentrically, and symmetrically disposed round a central feature, is contrary to the principles of Gothic architecture, and more in accordance with those of Classic architecture. In the former, each building or block might be symmetrical, but the assemblage of them would not be necessarily so, as each would be designed to suit its own particular object. The character of Gothic architecture more accords with the idea of a collection of partially-detached buildings, and extending over a greater space than in Classic architecture; and therefore, from this point of view, the Gothic style is particularly suited to the Law Courts buildings. There are no examples of ancient Gothic establishments, I believe, to guide us in this particular case. The great ecclesiastical establishments consisted of those detached buildings whose independent symmetry would have been marred by too close juxtaposition. But the later styles of Gothic would doubtless afford a groundwork for an assemblage of independent buildings into one connected mass, such as the Palace of Justice ought to be. None of the architects, however, appear to have tried those styles.

Then, if I may venture a step farther, and enter upon the still more debatable ground of the moral effect of a design: it appears to me that, if the Courts of Law are to some extent independent tribunals, that idea should be visibly expressed in the building. All persons should be able to perceive that it is a collection of courts, and the actual courts themselves should be the most prominent features throughout the whole mass. But a central hall is quite contrary to this conception of the design; for it makes it simply one huge place of assembly, one gigantic forum or basilica, to which various tribunals are attached.

Thus it appears that on all four counts—moral effect, æsthetic Gothic effect, convenience, and health—the verdict should be against the central hall.

It is true that I am now writing in ignorance of the plan of Mr. Street's latest design. The area, and its shape, and the required accommodation, may have been altered since the original instructions were issued; but judging from the elevation of it that has been published, the general idea is only a modification of his original one; and, it is to be feared, a modification made, not in accordance with Mr. Street's own wishes, but to meet the views of the Government. But supposing the accommodation required to have



PEABODY SQUARE, BLACKFRIARS ROAD.

been so reduced as to do away with some of the objections I have raised, what provision is there for future extension, such as will inevitably be required as the population increases.

I venture to put forward those doubts affecting the whole proceedings connected with the Law Courts buildings, as questions of professional art. As a constructor of some years' practice, I wish to protest against any designs limited by such instructions, as affecting the proper responsibility of an architect, and being incompatible with satisfactory work. And I hope that the leading architects of the country, who are all interested, and to some extent responsible, in the matter, will combine in requesting the Government to give an opportunity for a design to be made free from such trammels. Otherwise I fear the same result will happen to our latest and largest public building as has happened before in one or two such cases in this and other countries; that when it is half done, and a new Government in power not committed to the decisions of their predecessors, the building will be pulled down to make way for one on larger principles; and then not only will the time and money have been wasted, but it may be impossible to produce such a perfect work as could now be erected.

And I calculate on the support of Mr. Street himself to such a motion, as I should think he would not be sorry to have an opportunity of showing that his unfettered ability can produce a work which will be a mark, not of the past, but for the future, of English architecture.

J. B. COLLINSON,
Colonel Royal Engineers.

A New Pagoda has just been completed in Rangoon, amidst great popular rejoicings. The *Rangoon Gazette* says that "the total height of the pagoda and *htee* is shown at 240 cubits and 6 inches, equivalent to about 375 English feet."

PEABODY-SQUARE, BLACKFRIARS-ROAD.

PEABODY-SQUARE, recently erected for the Peabody Trustees from the designs of Mr. H. A. Darbishire, consists of sixteen blocks of buildings, inclosing two quadrangles communicating with each other, and is situated on the site of the old Magdalen Hospital, on the west side of Blackfriars-road, near the Surrey Theatre.

All the blocks are alike in construction and arrangement. They are four stories high, containing ten rooms on each story, and these are distributed in dwellings of one, two, and three rooms, giving a total of 384 dwellings, and 640 rooms.

The living-rooms measure 13 ft. by 11 ft., and the bedrooms average 13 ft. by 9 ft., with a height of 8 ft. 2 in. from floor to ceiling. The former contain the usual cooking range, with boiler, oven, and hot-plate, and are provided with cupboards, shelves, and meat-safes. Some are provided with coal-boxes, others have coal-stores in the adjacent sculleries. There are two sculleries on each floor, containing water-closet, sink, and water supply; also a dust-hopper communicating with dust-cellar in the basement, to which access is obtained by an interior staircase. A bath-room, with enamelled bath and plentiful water supply, is provided on the ground floor of each block.

These buildings differ from the majority of those which the trustees have erected, inasmuch as they have no corridors; the staircases are inclosed, and the washing accommodation is contained in laundries apart from the dwellings. The dimensions of the rooms, also, are rather larger, and their cupboard convenience is increased. The buildings are plainer, and less imposing in appearance, than their predecessors; their cost is materially less, and they are more popular with the tenants. As we said in the account we gave when they were first opened, they are more homelike and agreeable than the other establishments erected by the Trustees.

The laundries consist of two detached buildings, each containing accommodation for twenty washers at one time. The washing-rooms are on the ground-floor, with water-closet, wringing-machines, &c., and the drying-rooms are above. The works were executed by Messrs. William Cubitt & Co.

A portion of the site belonging to the trustees is still unoccupied, but it is proposed to cover it with similar buildings as soon as possible, the demand for the completed dwellings being considerably in excess of the present supply. We give with our view a block plan showing the position of the blocks, and a plan of one of them to a larger scale.

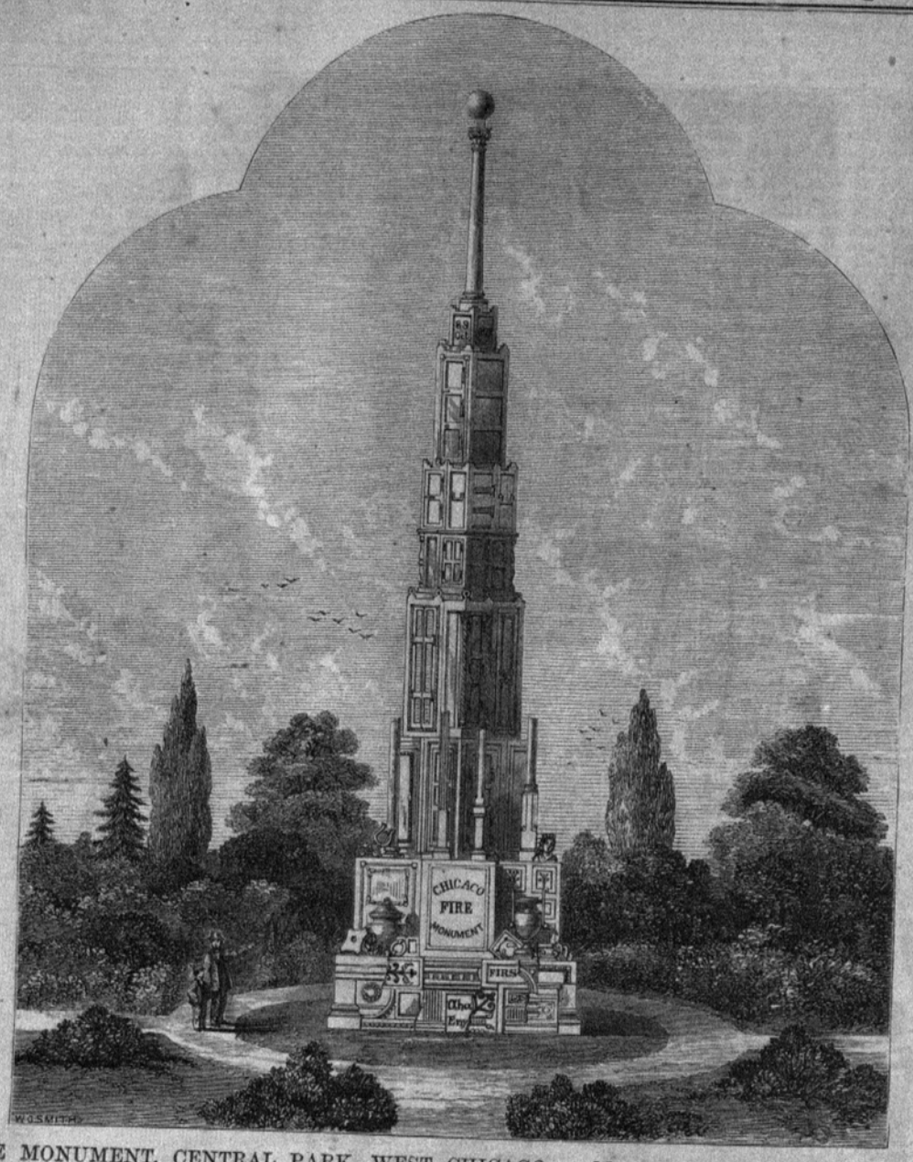
MONUMENT OF THE CHICAGO FIRE.

OUR engraving represents an odd monument about to be set up to record the recent dreadful fire. It is to be erected in Central Park, West Chicago, one of the large city parks, on a site just within the principal entrance, originally designed for a monument.

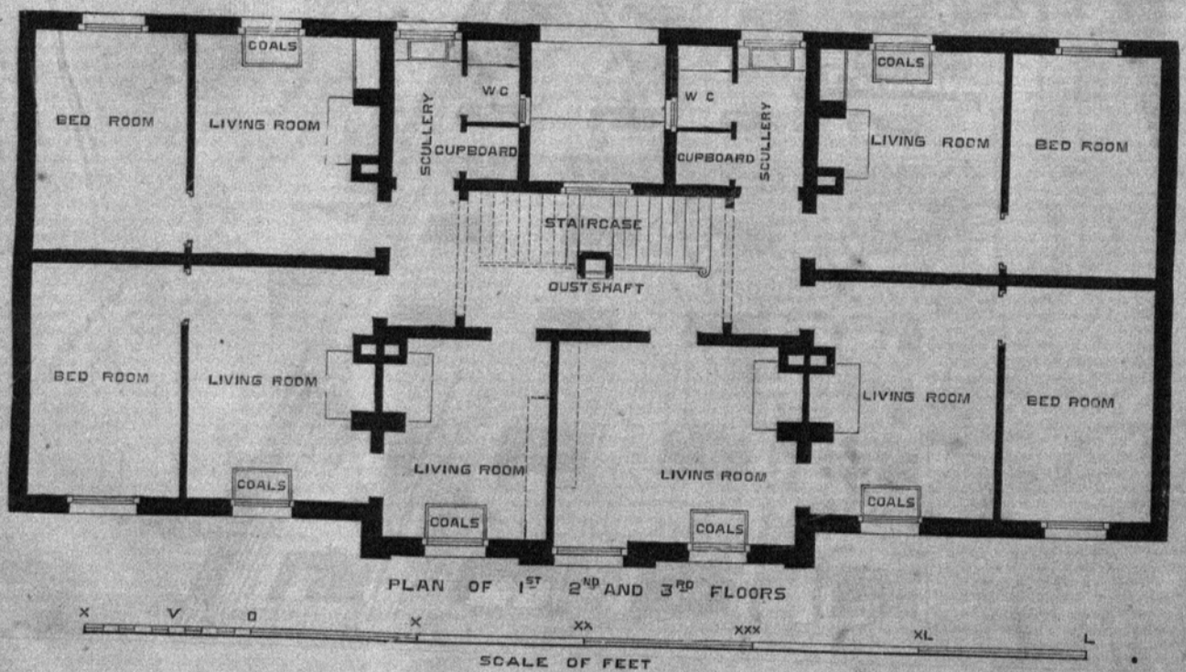
The materials are relics of the late fire that destroyed the entire business portion of the city, together with about one-third of the residences, and consist of iron safes, columns, sculptured stone cornice and ornaments, which have been presented for the purpose, and are now being hauled to the site.

The height of it will depend to some extent upon the amount of material collected; it will exceed 100 ft. The work of construction will commence as soon as the weather will permit. The architect is Mr. W. L. B. Jenney, of Chicago.

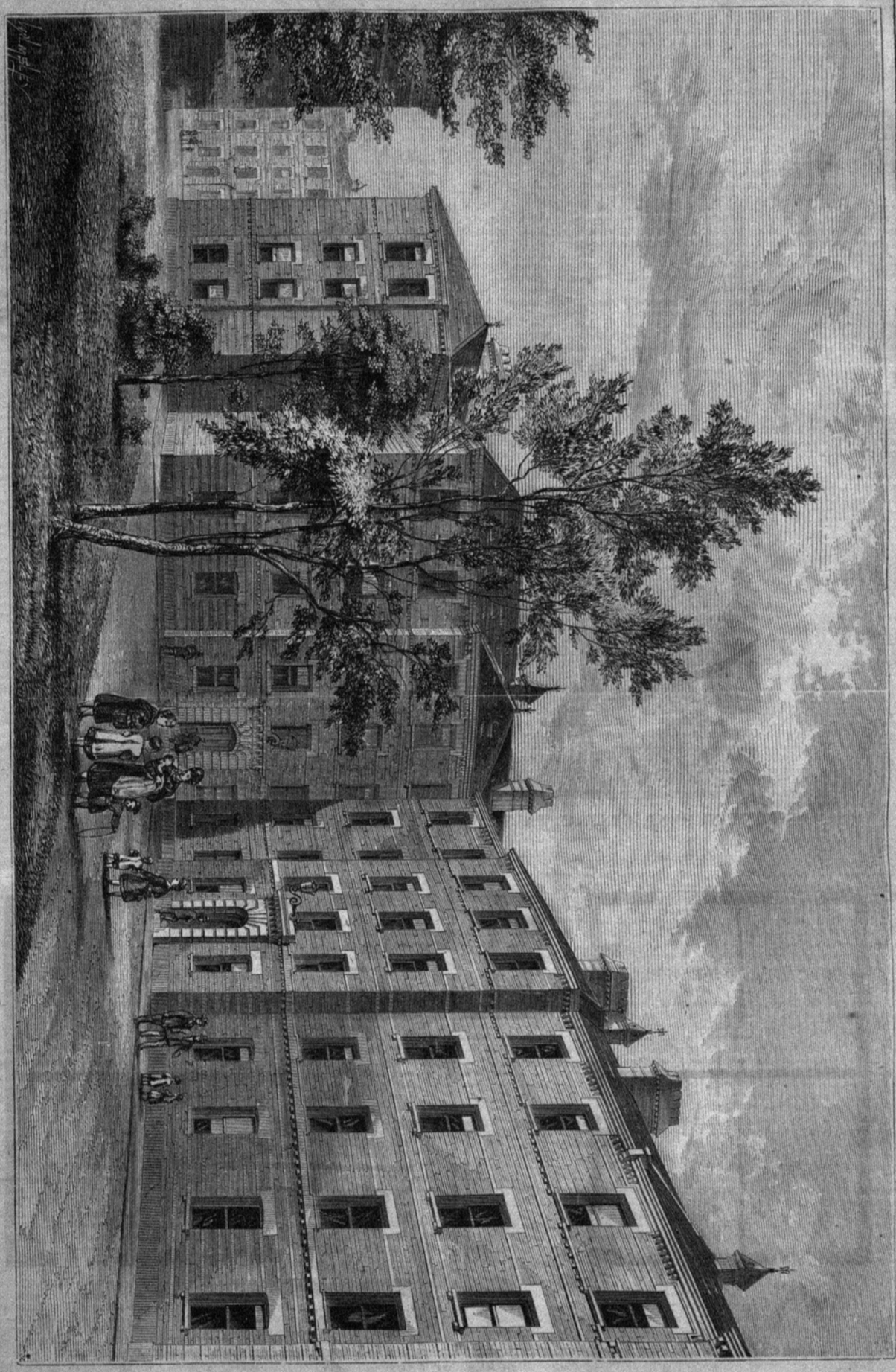
We can scarcely anticipate a satisfactory result; the monument will suggest the advertisement of an enterprising safe-maker. Chubb, Milner, or any other of our manufacturers in this line would doubtless supply good specimens for the purpose free.



FIRE MONUMENT, CENTRAL PARK, WEST CHICAGO.—MR. W. L. B. JENNEY, ARCHITECT.



PEABODY SQUARE, BLACKFRIARS ROAD.



PEABODY SQUARE, BLACKFRIARS ROAD.—MR. HENRY A. DARBISHIRE, ARCHITECT.

DEADLY WAKES AND WASTEFUL FUNERALS.

AN edict has at last gone forth against wakes and funerals, both in Ireland and England. Cardinal Cullen has felt it necessary, not only to condemn the demoralising practice of nursing the dead, but to threaten a sort of religious penalty that is likely to have some good effect with the members of his flock. It is many years now since the *Builder* first drew public attention to the pernicious and criminal custom of "waking the dead, and so killing the living," carried on in the homes of the London Irish.

An Irish Roman Catholic priest located at Camberwell has just made an announcement that the practice of "waking bodies is disgraceful." He cites what must be considered a terrible picture, that forty persons had sat in one room with the corpse, and that during the night fourteen gallons of beer were consumed.

To this painful picture might be added a little more colouring without the least exaggeration. Let us imagine that among these forty persons there were at least half of them females, the majority of them marriageable; and that besides the beer there was probably half a gallon of whisky drunk, and a quantity of tobacco smoked. The character of the songs and conversation that usually distinguish such gatherings can be imagined, and the moral degradation and blunted feelings they superinduce. Having ourselves witnessed Irish wakes, not alone in Ireland, but in London, in the wynds and closes of Edinburgh, Glasgow, Newcastle-on-Tyne, Birmingham, Sheffield, Leeds, Liverpool, and various other towns in the kingdom, we can form an estimate of their baneful effects.

We have known cases where the deceased, when living, was only existing from hand to mouth; yet his death and "wake" were the signal of the most wasteful expenditure on the part of his friends and relatives.

Many thousands of the London Irish are members of burial societies, to which husbands and wives pay certain weekly subscriptions, amounting from twopence to perhaps fourpence, and even sixpence a week. In this the conduct of these poor people is most commendable. The sums paid at death average, perhaps, from 50*s.*, for a child, and from 5*l.* to 10*l.* or 12*l.* for an adult (husband or wife). Unfortunately too often this sum that should be economised by the survivor in the providing for the funeral and the grave, while bethinking of the future, is thoughtlessly squandered in nursing the corpse, and feasting the jubilant mourners who come from miles around to drink with all due reverence, "The memory of the dead." Then comes the solemn mockery of the poor man's funeral, or the poor woman's, as the case may be, and more money is wastefully spent. Certain of the East-end undertakers, who specially provide Roman Catholic funerals, have in requisition "a Catholic hearse" for the conveyance of the deceased London Irish, and this custom has become so recognised, that many of the Irish poor would resent as an insult any attempt to convey the remains of their relative in any but the orthodox vehicle.

An Irish funeral of somewhat large dimensions may be seen almost any week in the year at the East-end of London, or in the Borough; but a bonâ-fide Irish funeral *cortége* and procession, with all honours, is becoming a rather rare occurrence anywhere out of the Emerald Isle.

Once the body is consigned to the earth, a few of the mourners may return straight home; but, unfortunately, a very large portion of the men who form the funeral procession will betake themselves to the public-houses in the vicinity, and night and drunkenness envelop the conclusion.

If the dignitaries of the Roman Catholic Church had begun their crusade a quarter of a century ago, how much disease and misery might have been prevented! Imagine, in the case of a man or woman dying, perhaps, of some dangerous disease, the body being waked from Wednesday or Thursday till Sunday afternoon, the coffin, even if there be one, till the last moment unclosed!

The love for "the Sunday funeral" induces the people to nurse their dead for days, to the imminent peril of the health of the entire neighbourhood. We are not exaggerating in any particular. What we state we know.

We are free to admit that there are respectable families who permit wakes in connexion with their deceased relatives from feelings of reverence and the old ties of country and custom. Neither religion, morality, public decency, nor public health can, however, sanction or permit the continuance of such a baneful custom. The practice is bad and reprehensible in all views, whether it take place in homes above the reach of want, or in the homes of the working poor. If people could only be brought to realise the picture usually presented at these "wakes," in all their baleful, senseless folly and wickedness, their extinction might be looked for. There are probably very few writers or reformers of abuses who in reality know aught from personal observation of these doings. Many here in London, who view them in the mind's eye through snatches of information from time to time in the newspapers, laugh at them, from their comical aspect. There are worse evils attending and arising from the practice of "wakes" than the drinking of beer and whisky,—worse evils even than the infection transmitted from the dead to the living. The corpse may be buried, and the drunkard resume his daily labour; but in the home of the dead there may be more than one sad remembrance of virtue undermined, of young womanhood unsexed, and the dolorous sequence in the streets and the river.

Let the clergymen of all creeds side with the law, and let the law be not harshly but firmly enforced. It is sufficient to cope with the evils we have pointed to.

AS TO A NEW STYLE.

THE question of a new style, which has lately been agitated, has closed, as usual, without producing any tangible results.

And thus it will ever be, until it is argued with a clearer conception of what constitutes a style of architecture than the writers of some of the letters I refer to have shown. A careful study of the history of the art will prove that the distinction between varying styles is not to be sought in the arbitrary use of certain "forms," "features," or "details," by one or the other, but that it lies far deeper, and is to be found in the characteristic mental tone of the builders themselves, of which such styles are an accurate reflex.

Let us take the case of the Greeks, a people whose leading characteristics were intense love of absolute perfection, and perfect confidence in their own ability to attain to it; whose emotions were few and kept carefully under control; unimpressionable advocates of philosophical calm, with a rooted distrust of variety. What sort of buildings could be expected of such a race, but just what they actually erected?—all on one simple fundamental plan, with no complicated construction or straining arches to destroy the appearance of self-contained repose which was the Greek ideal, but with all their homologous parts exactly uniform and worked up to as high a pitch of beauty as they were capable of.

It was far otherwise in the Middle Ages; the high emotional tone, the deep reverence of the Mediæval mind required to be impressed with the long-drawn aisles and lofty vaults of the Gothic church. In such a building the round form of arch inherited from the Romans, with its strong lateral thrusts, had no place; where economy of vertical space was not only useless but undesirable, the pointed form, which, in all its various uses, carries the aspiring principle firmly stamped upon it, was much more appropriate, and was no sooner discovered than universally adopted.

The same aspiring tendency carried the roof upwards into lofty gables externally, extended counter-weights into pinnacles, and tower-caps into spires; while a conviction of the unattainability of perfection, and yet of the necessity of pressing forward impatiently on the road to it, caused that roughness, want of finish, and healthy imperfection, which so much distinguish Gothic from Greek work.

Thus, with the exception of window tracery, the result of the accidental invention of coloured glass, we have the main distinctive features of Mediæval architecture; the production not of arbitrary "taste," but of an unalterable psychological law.

Did the limits of a letter allow, I might point out how Oriental indolence produced the flat surfaces and spiritless arches of Eastern architecture; how Egyptian gloom raised the massive piles that crowd that strange land; how the characters of the Chinese, Hindoos, and all other nations may be predicted from their architecture as safely as the habits of an animal from its organisation; how, finally, even the safeguard of literal copying has not prevented this age fixing its stamp faintly on the so-called revivals of other styles. Can we, then, believe that it would fail to fix it with firmness and vigour on an architecture developed anew from its elements? Revivals of old styles can never be a success, unless we reproduce the tone of thought of the age that gave them birth. The clear mind of Pugin saw this; but unfortunately his admiration of Mediæval art was so great that he actually proposed to effect such an impossible reproduction, and in his enthusiasm led the way himself.

By developing an architecture from its elements, I mean that we should begin in theory, as other nations did in practice, from simple squared masses of building material; and bringing to the work a sense of beauty trained by assiduous study of the Creator's noblest works, shape these rough blocks to such forms as shall give not only pleasure, but satisfaction to the faculty so cultivated; and beauty, I believe, is but the expression of an all-pervading, guiding *reason* in form.

We can then add ornament, the representation of the most admired works of nature, to give additional interest to the building; enrichment or patterns to relieve plain surfaces; and colour, whose use needs no comment.

The ancients designed on these principles buildings which are real and true organisms, each part designed especially for its own place, all together forming a harmonious whole. We pick their buildings to pieces, and, considering each part as a fixed quantity under the name of a "detail," or an "ornamental feature," patch them together, like children with a box of bricks, to form structures frequently with as little truth in them as the well-known monster of Horace's imagining.

To predict what the style of this age will be is, perhaps, premature; yet, I think that there can be no doubt that the breadth of view which distinguishes modern thought will tend to spaciousness in the area of buildings. The pointed arch, I think, will be found unsuited to the period, and the round form will be adopted, with a slight ellipticity (the long axis, of course, vertical) to give it that life and vigour wanting to the pure semicircle; and, as the Mediæval architects made the development of painted glass windows one of their chief cares, so the great problem of this age, I believe, will be, or rather has been, propounded by the invention of wrought-iron roofs.

I have already trespassed too much on your space; permit me but to add, that I should not have written a letter controverting, as this does, the opinion of so many eminent architects, had I not first practically proved the possibility of designing buildings, monumental and domestic, in the new style whose cause I am advocating. Although want of leisure has hitherto prevented the working out of complete illustrative drawings, yet if any gentlemen who take an interest in the subject should be willing to lend their assistance, a short time would suffice to lay the scheme before the public in its practical working, as well as in its theoretical bearing.

Let me not be misunderstood. I lay no claim whatever to the "invention of a new style." I am simply anxious to show that the style of the nineteenth century is not a visionary dream; and that its conversion from a potential to an actual existence is neither difficult nor troublesome.

A CAMBRIDGE GRADUATE.

THE SITE FOR THE LAW COURTS.

DEMOLITION OF THE BUILDINGS IN ST. CLEMENT'S DANES.

DURING the present week the owners and occupiers of the houses and other premises in St. Clement's Danes, whose property has been obtained by compulsory purchase for the purposes of the New Law Courts, have commenced preparation for giving up possession of their several tenements preparatory to the work of demolition being proceeded with. Miss Coventry, the proprietress of the "Anchor" dining-room and restaurant, opposite St. Clement's Church, and who has received 2,250*l.* as compensation for her lease and goodwill, closed her premises early in the week, and on Thursday had a sale of her effects preparatory to immediate removal. On Monday next, the 15th instant, the St. Clement's Danes Vestry, who have received 10,000*l.* for

their premises, including the old burial-ground and the almshouses adjoining, will give up possession of the property. Mr. Da Silva, the cigar-dealer and billiard proprietor, who occupies the premises next to the vestry-hall, and who has received 2,100*l.* in compensation, announces that he gives up possession at the end of the following week; and we understand that the Midland Railway Company, who occupy the premises adjoining as one of their parcel-offices, will remove about the same time. The occupiers of the four houses in St. Clement's-lane, leading to the Inn, who have also received notices, as well as the old matrons who occupy the six almshouses belonging to the Vestry, are to give up possession immediately, when the whole of the buildings will at once be taken down, but we learn that the bodies in the old churchyard will first be removed under the faculty granted by the Bishop of London. We understand that the St. Clement's Danes Vestry intend to make a comfortable provision for the inmates of the almhouses who will be turned out of their premises for the purposes of the New Law Courts.

SANITARY MATTERS.

Malton.—Drain fever and drain ventilation are *now* receiving every attention everywhere. The Malton Board of Health have appointed a special committee to inquire into the subject of drain ventilation, the condition of private houses as to drain-connexion and water-closet and soil-pipe ventilation, the covering of ashpits, and general sanitary matters. The inspector has been ordered to visit all houses using water-closets, to inspect drain arrangements, &c., and report.

Nottingham.—In a letter to the *Nottinghamshire Guardian*, Mr. Sidney R. Stevenson, architect and Surveyor, Nottingham, says:—Having been called in to inspect and report upon the condition of the drainage of property in the higher situations of Nottingham, I have been astonished to find so little care taken in the sanitary arrangements of the better class of houses. In one case I found the cold and hot water cisterns (fixed in the bath-room) supplied the kitchen, bath, and lavatory; and from the same cold-water cistern the water-closet was supplied. It is almost superfluous to tell your readers that through the closet-valve in the cistern the noxious gases from the main sewer have the chance to force themselves into all parts of the house, and to impregnate the water with their effluvia. . . . A factory owner, with whom I am well acquainted, states that when he has occasion to blow off steam the inhabitants of the adjacent small houses have frequently told him that the steam from the sewer has found its way through their drains and sink-traps into their houses. If such be the case with the floating steam of an engine boiler, with how much more power must the foul gases of the sewers force their way through the majority of drains and traps? A serious case of typhoid has just come under my own observation from this cause. The residence abuts upon what is considered to be one of the most healthy parts of Nottingham—the Arboretum. The effluvium accumulates in the sewers of the lower parts of the town and rushes to the higher, and by accelerated power the gases force their way through lavatory basins, closet valves, and places little suspected. Surely these facts are worthy the consideration of the Sanitary Committee and their able surveyor, Mr. Tarbotton.

Sheffield.—At a recent meeting of the Local Health Committee applications for the vacant post of chief sanitary inspector were opened. These numbered upwards of a hundred. Though the committee sat upwards of three hours, they found it impossible, having other business to transact, to read the testimonials of the various candidates, and to come to a decision upon them. The meeting was therefore adjourned. The committee were able, however, to come to a decision as to who were the most suitable candidates; and fifteen or sixteen of the best were selected. The list of the selected candidates was as follows:—Mr. Tudor, engineer, Manchester; Mr. Drake, sanitary inspector, Salford; Mr. Wever, civil engineer, Leicester; Mr. Clarke, sanitary inspector, Norwich; Mr. Roome, sanitary inspector, Rawmarsh; Mr. Dobson, sanitary inspector, Glasgow; Mr. Fitzpatrick, sanitary inspector, Liverpool; Mr. Coghlin, chief sanitary inspector, Margate; Mr. Winn, civil engineer; Mr. Maskell, from the office of Mr. M. E. Hadfield, Sheffield; Mr. Lancashire, from the office of the borough surveyor, Sheffield; Mr. Crofts, nuisance inspector, Huddersfield; Mr. Currie, chief sanitary inspector, Newcastle; Mr. Watson, Sheffield; and Mr. Griffith, sanitary inspector, Ashton-under-Lyne. The contest was ultimately between Mr. Roome and Mr. Crofts, and the latter was elected by a majority of one.

Pollution of the River Lea.—A deputation from the Society for Improving the Condition of the Poor, consisting of Mr. Charles Reed, M.P., Messrs. Robert King, Hacon, and Kemp, have attended the Lea Conservancy Board, to present a petition:—

"That the river Lea is the means of wholesome exercise and recreation to many thousands of the inhabitants of Hackney and of the East of London; that the discharge of part of the sewage of the parish of Tottenham into the river Lea, north of Bailey's-lane, makes both the river and its banks offensive to passers-by and dangerous to health, and pollutes the stream for the whole of its course through this parish; that those who live near the river and those who resort to it are exposed to the risk of disease by its defilement, and are deprived of the proper use and enjoyment of the river."

The petitioners therefore request that steps may be taken for preventing the sewage of Tottenham from being discharged into the river. The chairman received the petition, and stated that the Board was taking effective measures to suppress the evils complained of; but there were restrictions in their Act which retarded their proceedings; but he assured the deputation that the nuisance of the Tottenham sewage would soon be abated, as the Board had now under consideration a plan for the interception of the drainage of that populous place.

THE NEW "SOCIAL MOVEMENT."

MR. SCOTT RUSSELL has addressed a letter to the lords, gentlemen, and fellow-workmen who constituted his Representative Council of Working Men and Council of Legislators, containing a programme of the measures which he thinks are needful to turn the celebrated seven resolutions into legislative acts. He hopes it will soon become his duty "to lay before the Council of Legislators the communications they are awaiting;" but meanwhile, as the premature disclosure of their plans has for a while arrested the progress of the movement, he wishes to utilize the time by obtaining their individual co-operation, before the date of the meeting of Parliament.

He thinks that it should be stated in the preamble of these measures, that in some countries lands round towns are held by their inhabitants for the common good; that in England the Legislature has taken from the people millions of acres of common land, which were the entailed estate of the people; that though human beings have not been recognized as objects of value, skilled men and their families are national wealth, and the rearing and cultivating of healthy families is an object of the highest public utility. Parliament should, therefore, grant powers to villages and towns to purchase outlying lands just as railway companies do. The quantity to be—

"one acre for one-tenth part of the inhabitants in towns exceeding 20,000; half that quantity per head where the town exceeds 100,000; and in towns and villages under 10,000 it may reach one acre to five of the population. These lands are to be used as follows:—One half shall be appropriated to detached cottages in gardens, the other half shall be held as common land, left free in the middle of the cottage ground, within which there may be enclosed school-houses in their play-grounds and gardens, recreation-grounds for the people, a town-hall, market-houses, and places of instruction."

The Corporation to have powers of road-making, purchasing and letting property, building and pulling down and destroying unwholesome buildings and appropriating land for the common good. The revenue for these purposes would raise from the rent of land. The agricultural value of land is fifty shillings an acre; a town of 10,000 inhabitants would have to pay 25,000*l.* a year for its land. There would settled on that land 1,000 families in cottage gardens, who would pay 1,000 rentals of fifty shillings each; and, considering that the common lands have been taken from the poor for the benefit of the rich, they must be restored by means of a property-tax, which would, of course, fall on the rich. A third source of revenue would be the rental of the cottages. A rental of 105 shillings a year will not only pay for building a cottage, but will repay the capital in a moderate time; and thus "a rental of 155 shillings a year will give a family home, health, and garden ground." But for these purposes capital will be wanted, not less than 150,000,000*l.* sterling—the price of a war.

"The rentals of these cottages will defray the interest and repayment of this 150,000,000*l.*, and the land-tax will enable the artificial value of the land to be converted into Consols. The increased value of a million skilled men will be worth to the country more than 50,000,000*l.* a year in the enhanced value of the productions of their industry. Then there are roads, drainage, gas, police, markets, schools, and public buildings, and all the other elements of town organisation; these must be provided for by special revenues. The organisation of these communities is to be municipal.

"The public service is to be organised for the common good, on the fashion of the Post-office. An organised postal delivery, on the Swiss model of parcels and goods of all kinds, 'is of the highest importance to the well-being of the common people;' 'and the same is true of savings-banks, life and fire insurance, annuities, currency, and money.'

"In the middle of every group of homesteads the State will have to plant out a group of skilled teachers,—men skilled in head and hand, men specially skilled in the trades and occupations of the district."

In conclusion, Mr. Scott Russell begs that these proposals may be taken into consideration, "with a view of correcting and maturing them into fitness for laws." Whether they can be brought into one enactment or many, they all, he contends, hold together, and in his view any one will probably fail apart from all the rest. He therefore urges that these questions may be considered, "not as isolated measures tending to better only a part of an ill-conditioned human being, but as the elements of a condition of life tending to better and elevate the physical, moral, and intellectual well-being of the whole man."

BEHAVIOUR OF SAFES AND VAULTS IN FIRE.

THE experience of the late fire in Chicago affords much information regarding the relative merits of safes and vaults for the preservation of papers or other valuables. The work of digging out safes from the ruins, which was begun as soon as the heat of the smouldering piles would admit, resulted in proving the fact that safes, however well constructed, would not, under all circumstances, preserve their contents unharmed. Those placed in wooden buildings, as a rule, held papers and books in good condition; the materials of which such buildings were composed burned so quickly and entirely, leaving nothing remaining to smoulder and retain the fire, that safes did not become heated through. But in buildings of brick and stone the result was more unfortunate. The safes fell among masses of material which burned steadily, and gave forth intense heat for days after the first fire, and thwarted any attempts made at removal. The safes lying in the midst of such heaps of fire became intensely heated throughout, and when efforts to remove them were finally successful, their contents were found, in many cases, to be ruined. Books, papers, and bank-notes still retained their form, but had changed to black in colour, and, upon the slightest touch, crumbled into powder. In almost an exact proportion to the length of time they had been forced to remain in the burning ruins, safes were found to have their contents uninjured, or partially or totally destroyed. It is evident that, while a well-constructed safe will hold uninjured books and papers; yet, remaining in the fire for a long period, no one yet made will fulfil its purpose. With vaults the result proved entirely different. In nearly every instance well-built vaults held their contents intact. Bricks and mortar proved excellent non-conductors of heat, and upon the opening of large vaults which stood for some days in the midst of fire, their interiors were found scarcely warm, according to our authority, the *American Builder*.

These discoveries will doubtless have the effect of introducing more largely the construction of vaults in buildings devoted to business uses, and the disasters resulting from their faulty construction, of which the one in the Custom House furnished a notable example, will perhaps induce more care in building. A vault badly built is worse than a poor safe, for the latter does afford a degree of protection to what is within it, while the former gives no protection at all.

It must not be inferred from the statements made above that safes buried in the ruins of the late fire did not accomplish a great degree of good. Property of immense value was preserved through their agency, and where not exposed to heat of the most intense character, and for a long time, the safes generally stood the test well, and reflected credit on the makers, and must continue to be used, even where faults exist; for, to

secure perfect safety, valuables must be placed in a safe surrounded by a vault; and, for ordinary fires, safes have proved themselves equal to all requirements. But for such occasions as the late fire only vaults can afford the perfect security needed.

THE TRADES MOVEMENT.

London.—It is understood that a conference of the master builders of the metropolis is about to be held, to decide upon what steps should be taken with reference to the request of the Stonemasons' Society that the employers should adopt a uniform nine-hours system for the whole year, instead of confining the nine hours to the winter months, and terminating that rule on the 14th of February. Added to this, the demand on the part of the society for an advance of one penny an hour on the present rate of wages, on and after the 1st of July next, has caused a considerable amount of anxiety amongst the leading men in the trade—in fact, amongst the master builders generally,—as the penny an hour would add something like 10 per cent. to the present amout paid the men. Not the least important question to be considered by the conference is stated to be —in connexion with taking contracts—that of the large prospective increase in the cost of building operations, should the nine hours and advanced wages hereafter apply to other operatives in the building trade besides the stonemasons.——The East of London has been placarded with notices, offering labourers employment at Carlisle at the wage of 3s. 6d., with the additional inducements of cheap lodgings, daily payments, and railway fares paid.

Lock-out at Messrs. Pontifex & Wood's.—The General Council of the Amalgamated Society of Engineers have considered and discussed a dispute which has arisen between Messrs. Pontifex & Wood, the extensive engineers of Shoe-lane, and their workmen; and to decide what should be the action of the men with reference to proposals of their employers, by whom they have been locked out. Mr. William Allan, the general secretary of the society, stated that he had an interview with the firm on the previous day, and he now submitted to the council the proposals of Messrs. Pontifex & Wood. Mr. Pontifex said in effect that the nine-hours system had been conceded to the workmen, a rate for overtime having also been agreed upon. What the firm wanted was that the men should leave off work for tea at half-past four, that they should take half an hour for tea, that they should resume work at five, and leave off finally at six. For the overtime worked the firm were quite willing to pay their men at the rate of "time and a quarter." After discussing the question in various aspects, the council unanimously resolved that the proposal of Messrs. Pontifex & Wood could not be accepted by the men, as it was at variance with the principle of the nine hours.

Trades-union Congress at Nottingham.—The fourth annual congress of the trades' societies and trades' councils of the United Kingdom commenced at Nottingham on Monday. There was a large attendance of delegates. Mr. George Potter, of London, was elected chairman until the credentials of the delegates were received. He delivered a short address, in which he congratulated the delegates upon the prosperous state of the trades generally, and trusted that good results would emanate from the proceedings of the congress. The scrutineers' report showed that eight trades' councils and forty-three district organisations were represented at the congress. Seventy delegates had been accredited, representing constituencies amounting in the aggregate to 255,712. Mr. Leatherhead (Nottingham) was elected president for the ensuing year. The mayor of Nottingham entertained the delegates at a banquet in the Exchange-hall.

The Potteries.—The members of the various branches of the Operative Bricklayers' Society, in the Potteries, Newcastle-under-Lyne and district, have given notice to the master builders that they require an alteration in the "working rules of the Potteries," passed some short time ago by Mr. Davis, the late Stipendiary. In the first place, they ask that the time for leaving work shall be half-past five o'clock, instead of six, during the summer months, that they may be placed in the same position in that respect as the other branches of the building trades. In the second place, they ask for an advance of wages one farthing per hour.

Arbitration in Trade Disputes.—A "Bill to extend the Application of the Act to consolidate and amend the Laws relative to the Arbitration of Disputes between Masters and Workmen," which is to be introduced into Parliament early in the coming session, has been printed. It bears the names of Mr. Mundella, Mr. T. Brassey, Mr. Samuel Morley, Mr. W. H. Smith, and Mr. Thomas Hughes. The Bill is not a long one, having only eleven sections, with an appendix showing what portions of the Act of 5 Geo. IV., c. 96, are to be incorporated in the new law. The Bill provides that its provisions shall apply to all Boards formed for the purpose of settling disputes of any kind between masters and workmen in any trade; that every master who agrees to be bound by the decision of any Board shall keep displayed a copy of these rules, and give a copy to each of his workmen, who, receiving it, shall also be bound by the rules; that the attendance of persons and the production of documents shall be secured by proper means and under certain penalties; that the decisions of the Boards shall be in writing, and be enforced; that no member of any Board, or person bound by one, shall be liable to any penalty under any Act relating to breach of contract between masters and servants, of which such Board might under its rule take cognisance; that the acceptance of this Act by Boards shall be voluntary, and this acceptance may be entire or partial; and that the provisions of the Act shall not apply to Boards of conciliation only. There is to be, by the provisions of existing law, incorporated in the Bill, power to summon witnesses, and compel them to give evidence on pain of imprisonment; power for a married woman to lodge a complaint in the name of her husband, and for children in the name of parents and guardians; and power to enforce awards by distress or imprisonment.

THE THREATENED STRIKE OF MASONS.

SIR,—The threatened strike of the "Operative Stone-Masons" on 14th February, as announced by their secretary in your last issue, is one which will, if persisted in, lead in all probability to a repetition of the great "Builders' Strike" of 1859, with all its disastrous consequences. But, as one who suffered considerable loss on that occasion, I would earnestly beg the "Operative Masons" to consider what they are about, and whether they have any justification for plunging the whole building trade into confusion and loss. A strike of masons must necessarily involve a lock-out of other trades. It was only in October last that the "Operative Masons" sent to the Builders' Society a memorandum of their wishes, which was acceded to by the majority of London builders. This memorandum was to the effect that the hours of labour should be 50½ hours for the 14 winter weeks of the year, and 56½ hours for the other 38 weeks, or on an average something over 54, but less than 55 hours per week for the entire year.

But, as frost and bad weather are certain to interfere more or less with masonry, it follows that masons do not, under present regulations, work on an average 54 hours per week, which hours have been decided on by the whole engineering trade as a proper carrying out of the nine-hours system.

All my brother master builders to whom I have spoken agree that there is no reason for now altering the hours of masons' labour from those which they themselves put forth three months ago.

I hope sincerely that common sense will induce the "Operative Masons" to withdraw their notice. A MASTER BUILDER.

BIRMINGHAM, PAST AND FUTURE.

WHAT is going on in Birmingham, we fear, applies to many other towns. It is a subject often recurred to in the *Builder*. The editor of the *Birmingham Morning News*, in a leading article on this subject, says:—

The condition of the old part of almost any old town has been described and lamented over times without number. We shudder as we pass the street end of the crowded court, and we apologise for the vices of its inhabitants, by asking what better can be expected from those whose very conditions of life shut out from them the possibility of knowing what pure air or bright light is. We regret the existence of these dens of infamy.

But how many people are there in Birmingham who know at this moment in what manner the future dwellings of the poorer classes are being provided? Nothing is really known; nothing is plainly said. No official acquaints the Town Council, month by month, of what has been done to the permanent injury of the town. No one gets up in his place, or, indeed, has a place in which to get up and say,—"Since our last meeting, twenty, or forty, or sixty more so-called houses have been begun or finished, in which decent life is impossible, or in which it is possible to live with either health or happiness." And yet surely this is a matter whose importance cannot be exaggerated, and of which it is an absolute necessity that we have definite and exact information. For the fact is that, almost without exception, these additions to our town are in the hands of speculators whose worldly means are certainly not equal to their energy or activity. The buildings of the poor are mostly built by the poor, with money borrowed from the rich. The system of leaseholds is almost universal, and, comparatively speaking, freehold land is not to be obtained. If a piece of freehold land comes into the market, it is turned into leasehold without loss of time. The consequence is, that the constantly increasing endeavour is to place the largest number of tenements upon the smallest possible plot of land. By this means the ground-rent of each separate house is kept down to a minimum; and the success of the speculation is rendered more certain. The next object is to build the houses themselves with the smallest amount of material that can possibly be used. The walls are thin, the timbers are few and weak, the roofs are light, the internal fittings are of the cheapest and commonest description. Every method is studied by which space may be saved, and materials economised. One of the commonest, and, at the same time, one of the worst expedients, is to build rows of cottages back to back.

BUDA PEST COMPETITION.

THIS competition, in which the engineers and architects of all nations were invited to send in designs for the improvements of the capital of Hungary, was concluded in December last, and the only prize awarded to foreigners was gained by Mr. F. A. Klein, C.E., of Cannon-street, City, and Mr. Alexander Fraser, C.E., of Brook-street, Grosvenor-square, for superiority in the arrangement of the communications between different parts of the city, parks, ornamental works, waterworks, sewers, and docks.

CEMENTING RAINWATER TANKS.

MR. W. B. WILKINSON, in the *Builder* of the 2nd of December last (p. 944), states that the proper proportion for coatings of cement or brick to tanks, to make them impervious is, in his experience, 5 of cement to 1 of sand,—at least, so I understand his letter. This, however, differs so considerably from what is frequently practised and recommended, that it would be of much service if that gentleman would kindly write something further as to this matter. "Rendered with fine cement ¾ in. thick" is, I believe a fairly frequent description in architects' specifications, and, I presume, is also a description of the work executed under them. Some books of instructions could also be referred to where pure cement is either recommended or described as in ordinary use for this purpose. Intelligent builders are sometimes known to argue that a mixture with the best Portland cement of an equal quantity of the very sharpest and cleanest road-drift (say, from a flint-mended road) will add greatly to its success as a rendering coat, stating, as far as they become intelligible, that pure cement, from its expansive habits, ceases to adhere to the surface in parts, and stands out in bulges, in which cracks are afterwards formed, or pieces fall off; others, again, are found believing in something like this 1 and 1 proportion, alleging that the addition of the sand secures a slower setting of the coat, and with that a more equal contraction of the mass; that cracks are produced by the forcible separation of adjacent areas at a certain stage of the process of setting when the material is not thus prepared.

The proportions used by speculating builders in the neighbourhood of London for the cement flats which they love to put over the "wing buildings" of the stereotyped eight-roomed house in rows, are stated frequently as one of cement to two of sand. It is true that they rarely leave a thoroughly water-tight roof behind

them; but that may perhaps be attributed rather to the constructive habits of these builders than to the composition of their cement. This necessarily also is not a good guide for tanks; for although the flat has to resist rain falling with some force, it has usually a good fall, and gets rid of it quickly; whereas a rain-water tank holds a most ingenious and indefatigable prisoner, always searching to improve the least possible chance of escape.

An underground brick tank in use is not a very accessible place for conducting experiments; this perhaps is some excuse for a want of consentient judgment, and for a request for some carefully ascertained facts from those who have them in their possession. STAGNUM.

CONFERENCE COMMITTEE ON PUBLIC COMPETITIONS.

SIR,—Grant me a corner in your valuable journal to acknowledge, with thanks on the part of the committee, the receipt of communications on the above subject from the following gentlemen:—E. Ashworth, H. J. Austin, A. W. Blomfield, J. Boult, R. K. Blessley, W. E. Brown, S. C. Capes, W. Chick, T. C. Clarke, J. A. Cory, J. Cunningham, H. A. Darbishire, A. D. Dawnay, J. S. Dodd, G. A. Dunnage, Edward & Robertson, F. W. Fiddian, E. W. Godwin, A. S. Goodridge, W. J. Green, E. Gregg, R. Griffiths, G. H. Guillaume, F. R. Haswell, J. Hayward, C. Henman, J. Hicks, G. M. Hills, J. H. Hirst, J. Honeyman, J. W. Hugall, T. C. Hyne, H. Jarvis, jun., G. F. Jones, C. Lynam, W. H. Lynn, J. D. Mathews, F. R. Meeson, J. Milne, J. Morris, E. Nash, R. Owens, W. Papworth, R. Plumbe, T. S. Pope, R. L. Roumieu, E. C. Robins, J. Ruskin, J. P. Seddon, P. G. Smith, L. Solomon, T. C. Sorby, H. H. Statham, N. E. Stevens, G. E. Street, T. J. Street, E. Taylor, T. M. Taylor, J. Thomson, J. J. Thomson, A. H. Vale, Wadmore & Baker, D. Walker, F. Wallen, J. E. Watson, T. H. Watson, W. H. Weightman, W. J. Willcox, and C. G. Wray; besides two anonymous correspondents, who will oblige by sending their names.

ALFRED STRONG,
Hon. Sec. Conference Committee on Public Competitions.

CUTTING OAK TIMBER.

SIR,—I propose to panel a dining-room in a house in the country, and to cut down enough of my own oak timber to do it.

Will any one tell me what sized timber I should cut?—whether it is advisable to cut it in winter or summer, bearing in mind that if cut in winter all the bark is lost? Also, what sizes it should be cut into, and when?—that is, how long should it lie on the ground uncut; when should it be cut up; and, when sawn up and laid up to weather, what are the proper sizes for it to be sawn into as boards? What are the best lengths, widths, and thicknesses that the boards should be cut down into so as not to warp too much when finally cut into panels.

J. R. H.

EXHIBITION OF OLD MASTERS.

SIR,—Would you allow me to suggest to the directors of the Royal Academy that at the last week of this exhibition the time of closing should be extended to ten or eleven o'clock in the evening, and the price reduced to 6d.? The same plan is carried out at their annual exhibition. By so doing they would confer a boon on hundreds of people who have no other opportunities of seeing these grand old masters, and cannot lose half a day to do so.

J. R. GOUGH.

VENTILATION OF SEWERS.

AT a recent meeting of the local Board of West Derby, Liverpool, the following minute of Mr. Robert Rawlinson, C.B., on sewer ventilation, was received:—

"By a return recently made relative to the sewers in West Derby, it appears that about eleven miles of public sewers have been constructed, and that on these sewers there are seventy-five ventilating-shafts. It is considered necessary for safety to the public health to ventilate public sewers at intervals not further apart than 100 yards, or eighteen ventilating manholes and grates on each mile of main sewer. This rule requires that there should be on the eleven miles of West Derby main sewers 198 ventilating shafts, or 123 additional to those now in use. Rain-water spouts may serve to ventilate house-drains; but these should not be reckoned in reductions of main sewer ventilation. With means for sewer ventilation as indicated, the air in the sewers will be comparatively pure. There cannot be concentration or stagnation at any part of the system, and it is in concentration and stagnation that danger to health arises. With profuse ventilation there will not be perceptible smell at the ventilation-grates at any one point, as the dilution and dispersion of sewer gas will be unceasing. Foul smells and dangerous escapes of sewer gas only take place from sewers inadequately ventilated. The West Derby local Board has more fully ventilated the sewers of the district than many other local Boards; but, to be safe, the additional number, as now recommended, should be constructed."

The communication has been referred to the Main Sewerage Committee.

BUILDING OVER A SEWER.

AT the Hammersmith Police Court, Mr. Jonas Turner was summoned, before Mr. Ingham, by the Kensington Vestry, for erecting a party-wall over the crown of a sewer in the Brompton-road without their consent.

Mr. Harding, the clerk of the vestry, attended in support of the summons, and Mr. Clayton defended.

It appeared that in the construction of the Metropolitan District Railway through Brompton a sewer was diverted, and another built by the side of the tunnel, unknown to the Vestry. It was the main sewer for the drainage of Walton-street, which was in the parish of Chelsea. As the sewer was laid in the parish of Kensington, it was vested in the authority of the Vestry, under the Local Management Act. The existence of that sewer was brought under the notice of Mr. Broadbridge, the parish surveyor of Kensington, for the first time in August last, when the defendant's builders deposited a plan for draining three houses into it. The defendant had bought the land through which the sewer passed from the railway company, and had built three houses upon it. The wall in question had been erected over the sewer.

Mr. Claydon said the defendant purchased the right which the company possessed in the land, and he supposed that he could build his houses upon it.

Mr. Ingham fined the defendant 20s. and 2s. costs.

Books Received.

A Group of Englishmen (1795 *to* 1815). *Being Records of the Younger Wedgwoods and their Friends; embracing the History of the Discovery of Photography and a Fac-simile of the First Photograph.* By ELIZA METEYARD. London: Longmans, Green, & Co.

MISS METEYARD conceives that she has now traced the proofs which establish the fact that Thomas Wedgwood, the youngest son of the celebrated Josiah Wedgwood, and the only man of great ability amongst his sons, though an invalid for years, and unable to do much to show his ability to the world, was, nevertheless, the original discoverer of the photographic art.

"This fact," she says, "I have now, I think, set beyond all question. I have traced the link which connected the Frenchman Dominique Daguerre with the elder Wedgwood, and so onward, as far as my materials permitted, till we end with the testimony of Sir Humphry Davy and James Watt, the great engineer. If the letter descriptive of the processes of the 'silver pictures,' written in 1799, by Josiah Wedgwood,—the second to Watt,—should yet be found, every doubt as to the originator of this art must vanish; but the family of Thomas Wedgwood knew the discovery was his. We have the living testimony of their descendants to that effect; and the admirable fac-simile of the earliest known heliotype, or 'sun picture,' given in these pages will add strength to that testimony. Mr. Mayer, whose property it is, derived it from an undoubted source; and many of these heliotypes were, it is said, scattered at one time about the Potteries. Mr. H. Adlard, the eminent steel-engraver, has, through the labour of three distinct processes, admirably rendered the original heliotype; and Mr. Mayer, an authority in these matters, thinks that it was the sun's copy of an etching by Teniers, or one of his school."

It appears that so early as 1790 Thomas Wedgwood had a correspondence with Priestley as to researches on light, in which Wedgwood was engaged; and Priestley's letters are quoted to that effect. "I like very much the plan of experiments you mention," said Priestley, in one of them, "as they will very probably throw some new light on a very important subject, about which we as yet know very little: indeed, light and heat are little known, and yet I think they are as open to investigation as air." And, again, in the same year, Priestley says, "I do not know that any experiments have been made on the curious and important subjects you mention, and I have little doubt but your labours in so new a field will be crowned with considerable success. All that is known of the kind is the general aptitude of the more refrangible rays to be reflected in such media as water and the atmosphere." "There is nothing," added Priestley in a further letter, "more within the field of random speculation than light and heat; their connexion is evident, but which is the element of the other is unknown."

The immediate result of these experiments was the appearance of two papers on the "Production of Light from Different Bodies," in the volume of "Philosophical Transactions" for the year 1792. They are, as literary productions, very immature.

About 1802, the subject of the "silver pictures," so far as the name of Thomas Wedgwood is concerned, finally reappears. From about the year 1793-4, when his health gave way, he seems never to have repeated his experiments on any truly scientific scale; but his camera and other instruments remained at Etruria; and these, when seen by visitors, occasionally brought the subject under discussion. Mr. Chisholm and Mr. Josiah Wedgwood—who had been often present during these experiments—could give every detail; and thus when James Watt visited Etruria in 1799, on business relative to a hand-mill he and Boulton were supplying to the firm, the subject of Thomas Wedgwood's extraordinary discovery seems to have been discussed; and a few days later, Watt received a letter (probably a promised one) from Josiah Wedgwood, in which were given the details necessary to experiment. To this Watt replied,—"Dear Sir, I thank you for your directions for the silver pictures, on which, when at home, I shall try some experiments. I was thinking on your mill after I left you, and fear the motion of the spindle is too slow," &c.

"Now," says Miss Meteyard, "if the coloured pictures found in recent years at Soho, and the two 'heliotypes' still existing, and known to be the result of a most original discovery made by Thomas Wedgwood in 1791, were one and the same, would Mr. Wedgwood have given this detail of process, or Watt acknowledged its receipt? The business of producing cheap pictures by colour-washing had been carried on at Soho since 1772-3, and would not Watt have applied to Boulton or Egginton? or, indeed, would it have been necessary, when five minutes in the workshops close at hand would have supplied him with every process used in the application of colour to paper, pasteboard, wood, and metal? Moreover, the Soho pictures and the Wedgwood heliotypes, when seen side by side, are so utterly and wholly dissimilar as to present not a vestige of affinity. The same methods could not possibly have been used in their production. In the Soho pictures we see clearly a faded water-colour, generally lilac, shaded by faint black, laid on by a mechanical, though free, process, akin to stencilling; whereas, the two heliotypes still in existence show strongly the results of a metallic solution made active by some instantaneous process. The hues are those of tarnished silver, faint through time and an imperfect method of manipulation.

After his processes were perfected in 1772-3, Egginton produced these coloured copies of pictures by the score. They were usually sold in glazed and oval frames of black or gilt, and are still to be seen in the remote chambers of old houses. They generally represent subjects taken from Angelica Kauffmann, Benjamin West, Zoffany, Reynolds, and other fashionable painters of the time, this water-colour process being found more suitable to portraiture and figures than landscapes. But after the advent of Boydell and the fine engravers he employed, such mechanically-produced pictures fell into disrepute, and Boulton and Egginton were too commercially wise to continue the manufacture of unsaleable articles. The processes were discontinued, or turned to other accounts, the stock sold cheaply off, and such remnant as remained being stored away in the chambers and closets of a great manufactory, only came to light when the generation of workmen who had assisted in their production had died out."

Miss Meteyard's arguments, which, by the way, she seems to have rather weakened than strengthened, and rather unnecessarily, by a good many repetitions of "it may be," are finally clenched by the grand fact, that the paper published in the June (1802 ?) number of the "Journals of the Royal Institution," was headed "An Account of the Method of Copying Paintings upon Glass, *and of making Profiles by the Agency of Light upon the Nitrate of Silver.* Invented by Thomas Wedgwood, esq.; with Observations by H. Davy."

"Here," says Miss Meteyard, triumphantly, "in the plainest and briefest words, we have the fact of the invention, and the name of the inventor publicly stated by one who was not merely a friend, but a man of the highest moral character and scientific attainments. Egginton and Daguerre are as remote from these facts as though they had never existed. Had they been false, some other man would have claimed the discovery; or had it been practised elsewhere, the scientific and artistic rivalries of the day were sufficiently keen to have led at once to denial and adverse claims."

Of the processes employed or the results obtained from the heliotype experiments at the Royal Institution, no account exists. Of the earliest heliotypes, those taken at Etruria, 1791–3, two are still extant. One, a breakfast-table scene, is to be found engraved in the "Life of Wedgwood;" the second, and most valuable, is given by Miss Meteyard in her new volume. Of this she says,—

"It is clearly a heliotype, or, as we should now say, a photographic copy, of an ordinary book-engraving, for the cross-hatching of the graver's tool is distinctly visible. It was, probably, hastily torn from some book of travels lying on the table, for the purpose of fixing in the camera, or behind, the glass through which the rays of the sun were to pass. The original of this heliotype would just fit into an octavo volume, and appears to represent a Savoyard piper in the costume of his country. Finding some experiment succeeding, he may have torn a print from the nearest book at hand, and thus immortalised, by a new art, what in itself was intrinsically worthless. The authenticity of this heliotype is undoubted, and, as the earliest known specimen of a most original and beautiful discovery, is considered, by those most competent to judge, to be of great value."

The volume under notice is an interesting one, more especially as regards such friends of the family of the Wedgwoods as Coleridge, Godwin, Wordsworth, and others. Thomas Wedgwood was a benefactor to all of those named. He settled an annuity of 150*l.* on Coleridge; and not only were the costs of Coleridge's visit to Germany paid by him, but those of Wordsworth also,—a newly-discovered fact,—as appears from business documents, in which the exact sums sent to both are given.

The way in which a host of the documents on which much of both of Miss Meteyard's volumes on the Wedgwoods has been based were saved from destruction by "the right man in the right place" is wonderful. Mr. Mayer, of Liverpool, a well-known patron of art, took shelter, on one accidental occasion, during a shower, in a small scrap-shop, in the outskirts of Birmingham, while on his way to the Continent; and there he saw a number of old ledgers, but, on carelessly opening up the boards, he found them empty; sufficient remained, however, to show him that they were business ledgers of the Wedgwood establishment at Etruria. On expressing his surprise, the shop-keeper told him they had been very useful for wrapping bacon and butter in, and that he had lots more, but he was afraid they were of much less value, as they were not big books, but small bundles. "Let me see them," said Mr. Mayer; and he was conducted up a ladder, with many apologies, and into a dirty loft, where, literally, hundredweights lay, and the first paper he picked out was an inventory of goods taken by Flaxman to Rome in 1787. That Mr. Mayer secured the prize at so much a hundredweight need not be told, and he saw them himself sent safely to Liverpool. Miss Meteyard has had the advantage of rummaging at will through all this mass of valuable MSS. She has already made good use of them in both of her published volumes, and seems to contemplate putting them to other purposes equally interesting to the public.

Miscellanea.

The City Guilds and Technical Education.—On Wednesday afternoon a meeting of the masters and wardens of the various City Companies was held at the Mansion-house, under the presidency of the Lord Mayor, to consider the question of technical education, as affecting the guilds of the City. Reporters on presenting themselves were told that their attendance was not desired, as the meeting was purely a preliminary one, and confined to the masters and wardens of the companies, together with the various clerks. Several members of the livery committee are anxious that the various halls of the companies should be utilised, by having exhibitions in each relating to their various crafts; but the new idea advocated by the masters and wardens is, that an aggregate exhibition shall take place at the Crystal Palace periodically. We are informed that the only business of a practical nature transacted was the passing a resolution to form a preliminary committee, to consist of a member from each company, and to be elected by their respective companies.

Engineer Institute, Chatham.—The Chatham correspondent of the *Morning Post* says the works in connexion with the new Royal Engineer Institute, at the School of Military Engineering, are likely to be pushed on in earnest, Mr. Sollitt, the contractor, being now in possession of the site. The building is in the Italian style of architecture, with a spacious entrance situated in the centre of the principal front, over which are Corinthian columns, in Portland stone, supporting a cornice, which is surmounted by an open balustrade running the whole length of the building. The lower portion will be built with white bricks, whilst the upper part will be built of buff bricks. On the ground-floor there is to be a vestibule and hall, with lecture-theatre immediately in the rear, the access to it being in front of the main entrance. On the right are to be the halls of study for construction and military engineering, and on the left the library, which will be a spacious and noble room; and the clerk's and secretary's office, with accommodation for the Royal Engineer Committee, whose labours extend to almost every scientific subject in the art of war. On the first, or upper, floor, are rooms for the testing of materials, survey office, and photograph rooms; whilst on the basement floor there is ample room for printing, lithography, and the chemical laboratory.

The Channel Steam Ferry.—Plans are being made at Elswick of some hydraulic machinery to be used in Mr. John Fowler's scheme of carrying locomotives and railway carriages across the Channel from Dover to Calais. Sir William Armstrong has calculated that the machinery will hoist train and all from the rail into the ferry-boat in the space of 4 min. 37 sec.

Sanitary Condition of Mile-end.—Dr. Matthew Corner, Medical Officer of Health for Mile-end Old Town, has submitted his report on the condition and public health of the district for the year ending March, 1871, to the vestry of that hamlet. He accounts for its late appearance by saying that there was a considerable accession of work, caused by the presence of the small-pox epidemic; and before this had subsided, the rumours of the approach of cholera still further added to this work. If (he continues) the number of births and deaths proportionate to population may be taken,—the former as an indication of material prosperity, and the latter of good health,—it might be presumed that the hamlet maintains its reputation for salubrity. The number of births for the year was 3,724, or about 40·7 to every 1,000 of the present population. The corresponding rate for the whole metropolis was 35 per 1,000 population. The births exceeded the average for the previous five years by 333. The annual death-rate in the hamlet was 21·5 per 1,000 population living; that for the whole metropolis was 24 per 1,000 population. The report of Mr. H. Leshaw, sanitary inspector (which is appended to Dr. Corner's), gives an account of works executed during the years 1870-71, and shows that the improved health of the people of the hamlet is not without its specific cause.

Extraordinary Conduct of a Workman. At the Oldham County Police-court, Thomas Beesby, of Manchester, was charged with doing wilful damage to a rope. The prosecutor was a contractor, named Joseph Falkner, of Manchester. He had contracted to repair the top of a chimney at Boundary Mill, Chadderton. The prisoner was engaged to dress the stones. Some dispute arose, which resulted in another man being engaged in the prisoner's place. A number of men were raising stones, by means of the usual machinery, to the top of the chimney, when the prisoner went to the place and threatened that if they attempted to raise another stone he would cut the rope. He was told that if he did so he would endanger the lives of two men on the scaffold at the top. He left the place, but in a short time returned again with an axe. A stone weighing 5 cwt. was then being raised. The prisoner deliberately struck the rope with the axe and cut it in two. To save themselves from falling from a height of 50 ft., owing to the vibration, the two men at the top had to cling to the edge of the chimney. The prisoner afterwards cut the rope twice. The prosecutor confined the case to a demand for 1s. 6d. damage done to the rope. The prisoner was ordered to pay this amount, with costs, or be imprisoned seven days.

Swimming Baths for South London.—A large building has been erected in the New Kent-road, immediately at the back of the Elephant and Castle Railway Station, containing large swimming-baths, which are also convertible into two spacious halls, adapted for lectures and dramatic and theatrical entertainments. The length of the building is about 250 ft., one-half of which is devoted to a corridor, along which, on either hand, are over thirty private baths. In continuation is the great hall, or principal bath, which is also 125 ft. in length, and which, with two galleries, is capable of holding about 4,000 people. The interior of this hall will have attached to it a stage, measuring 52 ft. by 27 ft., which will be supplied with the mechanical contrivances necessary for producing theatrical entertainments. In addition to the large hall or bath there is a smaller one, which is 52 ft. in length by 17 ft. in breadth, and both will be supplied with all appurtenances suitable to the bather's comfort and convenience.

Land-spring next Gloucester House.—In the St. George's, Hanover-square, Committee of Works, Col. Ogilvy presiding, Mr. Walker asked the surveyor if he knew that there was a landspring in the house next to Gloucester House. Mr. Tomkins said he knew of it a short time ago. A builder made an application for permission to drain this landspring. It appeared that the medical officer (Dr. Aldis), reported to the vestry about this landspring in September and October, 1869.

Royal Architectural Museum.—We learn that a cast of the black marble tomb of Gundreda, wife of William de Warrene, and daughter of William the Conqueror, originally placed over her remains in the Chapter-house of Lewes Priory, has been given to the Architectural Museum.

The Inns of Court Hotel in Holborn.—This costly building, which was erected only a few years ago by the Lincoln's Inn Hotel Company, has recently been the subject of proceedings in Chancery, under liquidation, the business of the company having turned out an unprofitable speculation. The matter was before Mr. Church, the chief clerk, at the Chancery Chambers, on Tuesday, when it appeared that there were two offers for the absolute purchase of the establishment,—one by Mr. Sawyer for 50,000*l*., and another by Mr. Brooke for 70,000*l*., the object of the latter being to carry on the business of the hotel in conjunction with a number of the debenture-holders. The Chief Clerk adjourned the case in order to ascertain if Mr. Sawyer was prepared to make a further advance upon Mr. Brooke's offer, when it appeared he was; and the probability is that this building will shortly be purchased by new proprietors at the amount of its original cost. The Chief Clerk remarked that he should not sanction anything but an absolute purchase.

The West Ham Irrigation Scheme.—Mr. Robert Rawlinson, C.B., the Government Inspector, has held an inquiry at the town-hall, Stratford,

"in pursuance of the Local Government Act of 1858, and of a petition duly presented by the Local Board of Health for the district of West Ham, addressed to the Local Government Board, praying for the issue of a provisional order for the extension of their borrowing powers, in order to raise the capital required for the erection of sewage outfall and sewage distribution in the way of irrigation."

For this portion the Board propose to purchase, at a cost of 80,000*l*., Dagenham Farm, situated at about five miles' distance from the parish. Captain Flowers, R.E., the sanitary engineer of the Lea Conservancy, was present. After a lengthened discussion, Mr. Rawlinson summed up by pointing out that at Leamington, Northampton, Birmingham, and other large towns, after thousands had been spent, irrigation had to be resorted to; that the pollution of rivers was a most important matter; and that they must adopt some means for getting rid of their sewage otherwise than by passing it into the Lea.

Opening of New Waterworks at Winster. The populous Peak village of Winster has been a scene of great rejoicing, the occasion being the inauguration of the water supply. An ample supply of water had been found on the estate of Mr. Thornhill, at Stanton, which that gentleman readily placed at the disposal of the committee, and voluntarily gave 50*l*. towards defraying the expenses of conducting it to Winster. Lord George Cavendish, M.P., the Duke of Rutland, Capt. Arkwright, M.P., and many other persons in the neighbourhood, liberally contributed towards the object, and the result is that the water has been conducted from Stanton (about two miles) in pipes; and this and the formation of a reservoir is estimated to have cost about 1,000*l*. The inhabitants have also materially assisted by their contributions and labour.

Decoration of St. James's, Tunbridge Wells.—The chancel of this church has been decorated by Mr. Samuel Fry, of South Grove House. On a red ground are painted the sacred monograms, so as to form a diaper over the walls, and between the windows are scrolls, on which are written parts of Psalm xxii. and Isaiah liii., suitable to the subjects portrayed in the windows. The roof, which is painted a dark plum colour, is relieved with outline drawings of yellow ochre. The central subject is our Lord in Majesty: on each side are angels with trumpets, and others with censers in the act of adoration. Farther away from the centre are others holding scrolls, and above the figure of our Lord in the centre panel is the symbol of the Godhead.

New Works and Extensions in Sheffield. Large extensions of existing works are being made, or have recently been effected, at Sheffield, according to the local *Independent*, which gives a lengthened account of them. By far the most important of the new undertakings are the works of Messrs. Brown, Bailey, & Dixon. These works are now in course of erection, and it is expected they will be in full operation within the next six months. They will be by far the largest that have ever been erected in Sheffield at one time, as they stand on no less than thirteen acres, and will give immediate employment to 1,500 workmen The works are at Attercliffe.

The Restoration of Paris.—The destination resolved on for the great buildings of Paris burned under the Commune is as follows:—The Hôtel de Ville will be rebuilt by the city; the Tuileries and Palais Royal by the State; the Palace of the Legion of Honour by subscription; the Caisse des Dépôts et Consignations by the society itself. The Cour des Comptes, the Grenier d'Abondance, and the Ministry of Finance, being totally destroyed, will be razed to the ground and the sites sold. M. Thiers is particularly anxious for the restoration of the Tuileries, and will himself shortly present a proposal on that subject. The pavilion by the side of the river will alone be preserved in its present state. The two others and the connecting walls will be pulled down, as they are so damaged as to be useless.—*Galignani.*

The Thames Embankment Line of Frontage.—In the St. George's, Hanover-square, Vestry, Mr. Farrer asked Dr. Brewer if a line of frontage had been defined on the Thames Embankment. He understood it was proposed to erect an hotel on the Embankment, close to the railway-station at Westminster Bridge, and that the superintending architect had defined the line of frontage. Dr. Brewer replied that the line of frontage had been defined, and the plan deposited with Mr. E. Hollis, the clerk to the Westminster Board. He might add that if they took Mr. Horsman's house as one plumb and the Board of Control as another, and struck a line on the Embankment, that would define the line of frontage. Mr. Farrer gave notice of a motion on this subject.

Technical Examinations. — The Council of the Society of Arts have come to the resolution,—"That the time has now arrived when the present system of examinations is no longer necessary, and that the encouragement of particular subjects, bearing especially on arts, manufactures, and commerce, should be promoted by special means." It will therefore be seen that, after the next examinations, to be held in April, 1872, the present system will cease. The Council have under consideration a scheme of technical examinations. It is proposed they should give notice annually of the three, four, or five manufactures which would be taken up the following year, with a slight syllabus of the examinations which would be held at a few convenient centres.

Land in Manchester.—The *Manchester City News* gives the following as the result of the sales by auction of real property,—land, houses, and chief rents,—in Manchester and its immediate neighbourhood, for 1871:—January, 26,322*l.* 10*s.*; February, 13,645*l.*; March, 35,050*l.*; April, 47,343*l.*; May, 56,952*l.*; June, 12,217*l.* 10*s.*; July, 121,145*l.* 10*s.*; August, 23,077*l.*; September, 22,769*l.* 10*s.*; October, 32,795*l.* 10*s.*; November, 19,937*l.*; December, 25,017*l.* 10*s.*: total, 436,277*l.* The plot sold in St. Ann's-square, which was free from chief rent, brought the highest price of the year,—at the rate, namely, of 67*l.* 13*s.* 9*d.* the square yard. A small plot in Princess-street, opposite the new town-hall, sold last week at the rate of 33*l.* 14*s.* 7*d.* the square yard.

Archæological Discoveries at Athens.—Some interesting discoveries have been made in excavations at the Ceramicon of Athens. Several tombs, some quite intact, have been brought to light, and among them, it is said, is that of two ambassadors of Corcyra (Corfu), who formed part of the deputation from Xenophon, sent to ask for the assistance of the Athenians against the Lacedæmonians. Another bears the name of Hipparele, daughter of Alcibiades. Other researches have led to finding a monument, composed of five tombs, bearing inscriptions, and belonging to the Vexpleos family; and a sixth, ornamented with a basso-relievo composed of two women, one standing and the other seated.

Workmen for New Zealand.—We have had a large number of applications and letters, probably not fewer than a hundred, in consequence of mentioning in our last the report that agents from New South Wales were seeking to obtain the services of artizans for the construction of a railway in New Zealand. We have no further information on the subject. The persons concerned, if men are really wanted, should take means to make their address known.

Surveyorship.—Mr. Robt. Willey, M.R.I.B.A., of Ludgate-chambers, Ludgate-hill, has been appointed Surveyor to the Hand-in-Hand Insurance Office.

Settrington Church, near Malton.—The wall at the east end of this church has been painted in encaustic from designs by Mr. J. W. Knowles, of York. The space immediately above the altar-table, and extending across the chancel, has in the centre of it a Greek cross, between the arms of which are the emblems of the Evangelists, and on each side of the cross and at the extreme ends of the wall are borders in colours and gold, the spaces between having the Decalogue illuminated upon them. The dado underneath this design is of a deep red, diapered with a pattern of a pale shade of the same colours, black and gold, and the cornice which surmounts it, and is of stone, has been painted and picked out in gold and colours.

Victoria Park.—At last week's meeting of the Metropolitan Board of Works, a deputation, headed by Mr. C. Reed, M.P., expressed an earnest hope that the Board would recognise the importance of preventing any further building upon the open spaces immediately surrounding Victoria Park, and that measures would be taken for acquiring from the Government the land necessary for laying it out as a recreation-ground. A memorial embodying the views of the deputation was referred to the Works and General Purposes Committee.

Proposed New Buildings.—It is said that the late Baroness Weld has left the bulk of her property to Archbishop Manning for religious purposes. Among the special bequests are a large sum for the erection of a Roman Catholic church at Oxford; 7,000*l.* for the erection of a mortuary chapel in memory of her son, the late Captain Weld; various sums for the building of churches at Newbury, Twickenham, and London, and also for chapels in Surrey and Berkshire. Mr. Welby Pugin is named as architect to the whole of the buildings. The family threaten opposition.

New County Asylum for Lancashire.—There is at present in course of construction at Wittingham, near Preston, a large new county asylum for the pauper and other lunatics belonging to Lancashire, and which, it appears from a statement made at a meeting of the county magistrates held last week, will involve an expenditure of 120,000*l.* This is in addition to two other large establishments of a similar character which have recently been erected in the south-eastern and the south-western portions of the county, namely, at Prestwich, near Manchester, and at Rainhill, near Liverpool.

Improvements at Deal.—A block of houses, on the site of the old Navy-yard of the Government, is now in course of erection on the esplanade fronting the sea, called Prince of Wales's-terrace. These houses adjoin the picturesque Deal Castle, and will be completed in the spring, thus affording the seaside accommodation of private houses, boarding-houses, and hotel, so long required at this fast-rising watering-place.

The Power of the Diamond.—An interesting application of the material is furnished in the dressing of millstones. The intense hardness of the cutting material used,—the hard, black, uncleavable diamond,—is such that a single diamond has been employed for more than a year dressing a pair of French burr-millstones daily, without perceptible wear or diminution of cutting power.

Shaping Metals.—In a process lately proposed for shaping metals a mould is made in sections to suit the article required, and a sheet of metal is placed in it, after which a cover is clamped on to the mould, and water-pressure is conveyed to the interior by a pipe, whereby the metal is expanded to the counterpart of the mould.

A Year's Work by School Boards.—The *School Board Chronicle*, in surveying the work of the past year, finds that we have 330 school-boards, with others in course of formation. The great fact for rejoicing is that compulsory attendance at school is not likely to prove a difficulty, though at first it was the greatest bugbear.

Society for the Encouragement of the Fine Arts.—The first *conversazione* of the season will be held at the Suffolk-street Gallery on the 18th inst. On the 25th, a lecture will be delivered at the Gallery in Conduit-street on "Mexican Art," by Dr. Zerffi.

"Jack Plane."—We have received for Mrs. Randall from "An old Reader and Purchaser of the *Builder*," 1*l.* 1*s.*; from "R. T.," 6*d.*; and from "Four Sympathisers," 10*s.*

The Pugin Student's Drawings. — The drawings and sketches made by Mr. Ernest C. Lee during his tour as Pugin Student for 1870, have been exhibited on the wall of the Meeting Room of the Institute of Architects. A portion of them, viz., the series illustrating the Trinity Chapel and Corona, Canterbury Cathedral, have been presented to the Institute by Mr. Lee.

The Proceeds of the Passion Play.—The receipts at the late representations of the Passion Play at Ober Ammergau amounted altogether to 62,000 florins, of which 27,000 were given to the 600 actors, 1,200 to the poor, 3,600 reserved for public works, and 10,000 set apart for the construction of a theatre. The rest has not yet been disposed of.

The Proposed Cemetery at Clapton.—A letter has been sent by the Home Secretary to the promoters of the Clapton Park Cemetery Scheme, declining to approve of the proposed site for the purpose of a burial-ground. Mr. Bruce's decision has given great satisfaction to the inhabitants and owners of property in the district.

TENDERS

For the erection of a new parish church (exclusive of fittings and tower), at Uzmaston, Pembrokeshire. Mr. E. H. Lingen Barker, architect:—

Davies	£1,242 0 0
Harries	885 0 0
Lloyd & Lewis	852 0 0
Morgan & Jones	765 0 0
James	745 0 0

For new villa residence and stables, at Abingdon, Berks, for Mr. T. Townsend. Mr. Edwin Dolby, architect:—

Claridge	£1,728 0 0
Kimberley	1,650 0 0
Bryan	1,638 0 0
Honour & Castle	1,586 0 0
Johnson	1,578 0 0
Selby	1,561 2 0
Orchard	1,529 0 0
G. Jones	1,500 0 0
T. Jones (too late)	1,450 0 0

For the erection of 132 dwellings, in Ashfield-street, Liverpool, for the Liverpool Labourers' Dwellings Company. H. & A. P. Fry, architects:—

Roberts & Robinson	£21,795 0 0
Jones & Co.	21,540 0 0
J. & R. Duckworth	20,999 0 0
Rome	20,900 0 0
Mullin	20,729 0 0
Haigh & Co.	20,347 0 0
Urmson	20,329 0 0
W. & F. Witler	20,325 0 0
Gabbutt	20,100 0 0
Tomkinson & Co.	19,925 0 0
Thornton	19,800 0 0

For new church, Granard Park, Rochampton, for Col. Croll. Mr. Wm. Allen Dixon, architect. Quantities supplied:—

Eaton & Chapman	£2,450 0 0
Wicks, Bangs, & Co.	2,370 0 0
Manly & Rogers	2,247 0 0
Mann (accepted)	2,145 0 0

For additions, &c., to Prince of Wales Tavern, Camberwell. Mr. J. L. Stewart, architect. Quantities supplied:—

Clarke	£1,498 0 0
Smith	1,463 0 0
Ebbs & Son	1,313 0 0
Elliott	1,098 0 0
Wyatt	1,030 0 0
Gough	989 0 0
Blease	973 0 0
Poulson	959 0 0
Jerrard	894 0 0
Tapley & Co.	839 0 0

For taking up and relaying sewers, on the Harvey Estate, Leytonstone, for the Leytonstone Sewer Authority. Mr. John T. Bressey, surveyor:—

Cole	£375 10 0
Still	355 0 0
Dunkley	345 11 0
Ingham	333 0 0
Potter	324 0 0
Harris	319 0 0
Pizzey	295 0 0
G. Jackson	270 0 0
Hubbard	265 0 0
J. Jackson	229 10 0
Goodair	202 0 0
Sparrow	195 0 0

For stables, &c., at Old Ford, for the London General Omnibus Co. Under the supervision of Mr. P. Tosh. Quantities supplied by Mr. A. J. Bolton:—

Heath	£724 0 0
Aldous	721 0 0
Crabb	717 0 0
Blease	683 0 0
Vaughan	647 0 0
Adins & Son	647 0 0
Johnson & Co.	622 0 0
Ford	586 0 0
Atchinson & Walker	585 0 0
Garrud	537 0 0
Robbins & Co.	517 0 0

For coach-house, stables, and boundaries, at Hampstead, for Mr. James Harvey. Wm. Allen Dixon, architect:—

Wicks, Bangs, & Co. (accepted)	£912 0 0

The Builder.

VOL. XXX.—No. 1511.

Originality.

TO glance at the primitive signification of a word, so far back as it can be traced, gives us sometimes a hint of more than mere philology, a suggestion for apprehending more clearly the precise value of the idea hidden under an expression which has become hackneyed and dulled in its signification by constant use. The secondary meaning which such a word has acquired may be very different from its primitive meaning, yet the relation between the two may read a practical lesson. In architecture, for instance, there is now an almost pathetic cry raised, a kind of *vox clamantis in deserto*, for "originality." The same demand is made in other quarters; in literature notably, and with some very queer results in response thereto; but it is more strongly and perseveringly urged in regard to architecture than to any other art. In many cases the demand seems the result of a wholesale development of negative criticism, on the part of writers who reverse Pope's conclusion, and say "nothing that *is*, is right:" *ergo*, give us something new; we do not mind what, so long as it is new. In this case it is clear that "originality" only means "novelty," and is used in that sense, whether intentionally or not. In common conversation, however, the word is used in almost exactly the same sense as "individuality;" some quality or manner which gives a distinctive character to a man's work, by which we recognise it as his among other productions of the same class. A good many painters, a good many writers, are currently spoken of as "very original," of whom the expression is only true in this sense, and when, in fact, the more correct expression often would be that they are "very mannered;" a phrase which cannot really imply the same thing as "original," since the one expression is always used with a complimentary, the other with an uncomplimentary, meaning. And as to novelty, if we set a column with its base upwards, and standing on its abacus, that would be "novel," no doubt, but would scarcely be praised as "original."

Origo is described in Latin dictionaries as derived from the verb *orior* (to arise), and its primitive meaning given as "that which causes a rising or springing up." And from one point of view this derivation certainly countenances to some extent the ordinary meaning attached to the word, as nearly synonymous with "individuality." That which has its source and "uprising" in the artist's own mind will be characterised by his own individuality, the latter being the apparent result, the former the hidden cause. But it is just this originating in the artist's own mind which it is so difficult to get, and which is so rarely met with. We are so influenced by the ideas of others, so biassed in our judgment by what has been done previously, so dependent on our predecessors for helps and suggestions, that it is only a small chance that is left for most of us to thrust into the composition anything that peculiarly belongs to our own mind and personality. It is only a few of the rarest and most powerful minds who have been able to become really founders of new ideas in art, "full-welling fountain-heads of change." The rest, it should seem, must be content to copy largely, to take most of their ideas second-hand, or to do nothing. "There's the respect that makes calamity" of so much of our architecture, in the eyes of the desponding school of critics. And if it is necessary to originality that each work of art should present a wholly new interest of its own, independently of whatever has gone before it, then is their despondency in this point very well founded indeed, so far as all analogy will enable us to judge. But the demand made by this class of critics upon architecture is an unreasonable one, in degree if not in kind, and such as would not be made upon any other art. We do not demand that each musician should invent new forms of composition, new principles of harmony, before we will allow him originality; we are satisfied if he can give his own colouring, his own treatment, to his ideas, without necessarily ignoring or departing from the laws and practice which governed his predecessors. We do not expect a new poet to invent a new language (and heartily wish some of them would not try!), or a painter a new system of manipulation. Yet these are hardly greater demands, relatively, than are made on the hapless architect by some of his advisers. But even if we waive the question as to the amount of originality of this kind to be demanded, is there not a question also as to whether this is the right way to look at the matter at all? Is it not just as fair and logical (and etymological too) to regard "originality" as signifying, not the effort on the part of each one to raise designs out of his own moral consciousness, but the return in each case to the original principle or motive on which the design of any particular object should be founded? Is not this in fact almost the very essence of originality, in so far as it can be obtained by the majority? We have occasionally minds which seem to be a new era in themselves; but for the most of men what is needed to make their productions worth terming original, is that they should look to the primitive meaning and intention of what they are designing, and treat it *ab initio* in their own manner, and not in somebody else's manner. When working on this principle, almost every man who is educated, and who thinks at all, has his own natural bias, his own idiosyncracy, sufficiently marked to give distinctive character to his work. If, on the contrary, he works on a fixed type, accepted or thrust upon him, he voluntarily casts aside the main means and possibility of being original, and instead of enjoying the opportunity of varying the expression of an idea, he only allows himself scope for varying the form of other person's expressions. This drawback to originality in design is not confined to, or peculiar to, architecture. We see it, for instance, in the works of the earlier sacred painters of Italy, where certain types were accepted and followed for generations, not only for the faces and aspects of particular personages, but even for the treatment and disposition of the whole subject in representing such incidents, for example, as the baptism of Christ. Genuine originality was of course almost as impossible for painters under such circumstances, as it is for architects when they are willing to accept one particular type for a church, or for isolated portions of it, or of any other building.

Now, this consideration indicates, we think, more distinctly than it has hitherto been indicated by architectural critics, the essential difference between originality, properly so called, and mere mannerism, novelty, or eccentricity. The latter is something only on the surface of a work of art, not in the least touching its intellectual value or the basis of its composition. When Sterne, in the later books of "Tristram Shandy," took to the devices of coloured leaves, blank pages, and unfinished paragraphs, this was not that he was more original than at first, but less so: he had worked far away from the original vein of humour from which the book had started, and, having spun it out beyond its limits, had recourse to these shallow devices to keep up the flagging interest of his readers. In like manner, when an architectural designer invents extraordinary and portentous chamfers over his doors, designs arches with scarcely any vertical pier, and with enormously deep voussoirs, and puts buttresses just where no one would expect them, this is not being original, but just the reverse: it is a proof that he has lost sight of the original object and end of building,—that he is using features without thinking of their origin or the principle on which they should be treated, and is only trying for a sort of cheap notoriety, by differing in small details from every one else, without purpose or reason, and deserves no higher praise than that of mere oddity. The worst of this kind of so-called originality is, that there is no rational limit to it, the effort of each one of the eccentric designers being to surpass the others in eccentricity; and as there is no principle to regulate or restrain their devices, such artists are driven to producing effect by a perpetually stronger dose, till their designs become little more than a jumble of unmeaning whimsicalities.

To exemplify: if an architect has a window to design, he may choose to start from the assumption, either deliberately made or acted on through habit, that one particular form of window is the only one worth taking as a type, in the matter of design,—a pointed Gothic window, for instance, with moulded jambs and archivolt. Now, this leaves a very narrow field for the introduction of individual treatment. He can vary the radius of his arch and the profile of his mouldings; and, in order to be "original," he will take, perhaps, to some abnormal proportion of window, all height and no width, or the reverse, or will invent some ineffective variation of the moulding in the jambs in order to say that he did not copy, but was original. But if, instead of taking a Gothic window as his *point de départ*, he take the original idea of a window, which might be stated thus,—an opening for admitting light from without and for prospect from within, capable of variety of proportion in height and width, of being covered at the top in various ways (by an arch, a lintel, or a combination of the two), presenting two special surfaces for decorative treatment (viz., the jamb and soffit at right angles to the window plane, and the filling in of the window plane itself, which may be decorative in an almost infinite number of ways), requiring an effectual and rapid removal of the rain from it at the foot, and in some situations being all the better for a weatherfend against sun or rain over the head,—if the feature, we say, be regarded in this way, there are fifty more chances of getting at an original treatment of it than if some one else's previous treatment were adopted as a fixed type, and we are limited merely to minute variations in detail of that type. And this would be originality in the true meaning of the word, attained by going to the origin of the feature, and taking the designer's own treatment of it from the beginning.

So of any other feature; a door, a tower, a porch: the question for the "original" architect is not, "What new variation can I make in the orthodox method of treating this feature?" but rather "What is the object of this feature, and how can I render it expressive and ornamental,

in keeping with that object?" We do not say that thus it would be possible for every architect to invent his own new treatment of every feature; the majority would necessarily be influenced in their ideas, some more and some less, by what others have done; nor do we say that it is either possible or necessary to do this kind of thinking out, *ab initio*, of everything a man has to design. Life is so short that the busiest amongst us especially are compelled to take many of our thoughts at second-hand. And it is probably quite true also, as several critics have urged, that the man who has studied most of other styles in all their varieties, will be the one likely to have the greatest number of original ideas at his command; for two different treatments of one feature will often suggest a third, again capable of variation, and so on. But we cannot help thinking that if this view of "originality" were more recognised and borne in mind by our architects, there would be more chance of really original designs making their appearance, not only from the fact that the mind of the designer would be applied to the consideration of what really was wanted to make an architectural treatment in a particular case, instead of what it might be the fashion to want, but also because from such a point of view even the copying and adaptation of other designs assumes a new aspect, since it is regulated by a principle which teaches us to adopt what is essential in the treatment, and ignore what is accidental, and thus places some sort of bounds to that reckless variation for variation's sake which has led to so many absurd eccentricities in modern architecture.

There will be one drawback, however, in the eyes of many modern architects, at least, to this view of originality, that in this case "originality" means *thought*. And people are living too fast now to pay anything for thought, and 5 per cent. certainly will not pay for it, in most cases, at least. It is to be feared that we cannot show our readers the way off the horns of the dilemma, except by adopting the simple but unpalatable course of doing work well, and being content to be ill paid for it. Whether the public mind will ever be in a state to recognise that there may be more thought in one building than in another (as they recognise it to some extent in paintings), and to be willing to pay for this thought as "value received," is very problematical; but we take this to be the answer to those who demand more originality in architecture. Coleridge said that "to admire *on principle* is the only way to imitate without loss of originality,"—a dictum which the late Mr. Leslie adopted as a motto for his "Hand-Book for young Painters." Applying the same thought, we should say to the architects, that to design on principle is the only way to insure originality.

OUR GREAT FORTIFICATIONS AT PORTSMOUTH.

THE effect on the architecture of the future of the employment of iron as a main material for building is a subject of extreme interest. It is not the architect alone who is concerned in the matter. While the architecture of a country, or of a period, is a reflection of the manners of the time, it reacts, in its turn, on the habits of the people. As far back as structural relics allow us to judge,—and the period is one not readily estimated in centuries,—the exigences of military defence have greatly defined architectural progress. When to the strength of structure required for safety we add the means of such appeal to the imagination as was suggested by the rites of religion, we sum up the chief motives of architecture.

Six years ago (*Builder*, vol. xxiv., p. 73), as well as at other times, we ventured to offer some considerations on the effect likely to be produced on military, and thus on civic, architecture by the rapid strides that were being made in the improvement of projectiles. The Italian war had yielded novel and valuable experience, in the siege and fall of the once impregnable Gaeta, of the revolution that was in progress. Quietly and steadily, since that time, have our own Royal Engineers been at work, aided by the powerful resources of the Fairbairn Company at Manchester, in the preparation of an impregnable line of defences for our great naval arsenal of Portsmouth. With the commencement of the present year, the most novel part of these defences,—the skeleton framework of one of the largest iron forts,—has advanced to a condition which renders some detail likely to be acceptable.

The idea of impregnable fortifications is as old as any records of mankind,—older, it is possible than the lineal progenitors of any existing human races. What thews and muscles were theirs who reared the enormous megalithic structures of prehistoric date we have no means of judging. But we know that, not farther back than two and a half millenniums, the great brick-building people that dwelt in the fertile valley watered by the Euphrates and the Tigris surrounded their thickly-populated home with enormous mounds of earth, faced with stone and with brick, from the broad summit of which even their women looked with contempt upon the armed forces of the invader.

What were the causes that led to the abandonment of the Assyrian method of fortifying large cities, or rather walled provinces, it is not easy to determine. The fact of the repeated capture of Babylon, and the knowledge of the power possessed by an invader of diverting the course of the great river that watered so large a population, must have told for much. But walls, though less stupendous, were still reared by the founder of cities. So late as the Roman occupation of England, that great engineering people drew lines across the northern boundaries of the island, to exclude the ravages of the Pictish and Scottish tribes. And the sentinels on the Great Wall of China still watch over this costly outwork of the stereotyped civilisation of the flowery land.

With the change in European life that succeeded the settling down of the successive waves of northern barbarians that had overflowed the corrupt and effete Roman Empire, individuals, whether petty rulers, great lords, or even municipal authorities, assumed more prominence than was accorded to any but the supreme heads and fathers of the nation in earlier times. Thus seigneurial castles and keeps arose, and the towers of many a robber chief dotted the landscape, in a manner more conducive to its picturesque charms than to the well-being of the inhabitants at large. We have examples of one kind of castle in the ancient Papal residence at Avignon. In this country we may point to Rochester Castle, as one of somewhat similar structure. The idea, indeed, of these square turreted buildings is illustrated by the Tower of London. But it is to another class of fortalices, such as is represented by the great Round Tower of Windsor, or by the Castle of St. Angelo, on a large scale, or by Conisborough Castle, in Yorkshire, and many an Irish tower on a small one, that our attention is recalled by the newest phase of our military architecture.

The combination of strength, economy of material, and economy of space that is given by a tubular structure is well known, even to those who have not pushed their experimental researches further than the examination of a stalk of wheat. For a defensible residence, a round tower, in the first instance, offers the most appropriate form. We remarked, not very long ago, as to the great number of these structures that rose, especially in Italy, before the introduction of gunpowder. But with that great advance in the science of offence, a new state of things arose. A single tower presented a mark that might be readily and fatally attacked by converging lines of fire. With imperfect artillery, the balance of force was greatly on the side of the attack. Private turrets, as no longer defensible, rapidly disappeared.

With regard to the defence of towers, or of regular fortifications, the erection of the noble circular towers that yet mark some fine old Norman structures was discontinued for two reasons. One was, that it was desirable to have the means of sweeping the assailants from the ditch by a well-directed fire. This the defenders of a round tower, or system of round towers connected by curtains, could not readily effect. The other was, that from every port-hole, or every embrasure, the gun pointed in a radial direction. Concentration of the fire of the defence on the head of the attack was thus impossible. For three excellent military reasons round towers, in spite of their great structural advantage, disappeared altogether from defensive works, even before the time of the organisation of the polygonal system by Vauban.

The latest outcome of engineering science applied to defensive structures has brought us back to round towers. At Sheerness, below Gillingham, and at one or two other commanding points near the junction of the Thames and the Medway, have recently been constructed new river defences of London and of Chatham. Neither the metropolis nor the great school of our army can now be reached by any hostile vessel. These new forts are circular in plan, built in part of granite, but with the portholes of their enormous guns protected by iron shields and framework of a strength suited to resist the utmost force of shot that can by any means be expected to reach them.

It speaks well for the officers and manufacturers who have been so long and so ably at work to protect the vital centres of the country from that surprise to which, a quarter of a century ago, we unquestionably lay open, that so little public attention has been hitherto directed to the progress of these important works. The notice that is now taken of those in course of execution for Portsmouth is due to the fact that the vast iron ribs of a structure that is without a rival in its gigantic strength (looking at the twin towers of 200 feet diameter each, and at the two smaller ones of 150 ft. and 120 ft. diameter, as forming parts of the same system of defence) have just been fitted together on the premises of the manufacturers at Manchester.

Portsmouth, it is asserted, when these works are completed, will not only be safe from any attack by sea, for we are approaching the limit of possible sea-borne batteries and offensive means, but she will be safe even in the unpleasant contingency of an attack by land. Eleven hundred thousand pounds is the sum that we are now spending in what our French neighbours call the blinding,—that is to say, the sheathing in a thick, impenetrable, ponderous shell of iron,—of the four forts that form the most novel and formidable features of these defences.

Of the great twin towers which are hereafter to give meaning to the line,—

"Britannia needs no bulwark, no towers along the steep,"

one is situated on a spot known by the name of No Man's Land, about 2,000 yards to the north of Ryde Sands, and the other upon the Horse Sand Shoal, some 3,500 yards south of Southsea. The main entrance to Portsmouth harbour lies between these two gigantic sentinels, which can bring their fire to bear on the channel at a distance from one another of only 2,000 yards. With these main forts are connected two others of similar construction, but of somewhat smaller proportions, the least of which,—that of St. Helen's, on the west of the Isle of Wight,—is of a diameter of 130 ft.

The two larger towers carry each two tiers of guns, the lower one containing twenty-four 600-pounders, of 12-in. bore, and weighing 25 tons each; the upper, twenty-five 400-pounders, of 10-in. bore, and a weight of 18 tons. The former throw a bolt weighing 600 pounds, which is propelled by the explosion of 85 pounds of powder. The velocity of the shot on leaving the muzzle of the gun is 1,300 ft. in a second. The force of impact is 7,000 foot tons at the muzzle, and 6,000 foot tons at a distance of 800 yards. In what we must comparatively call the smaller guns, the weight of projectile is 400 pounds, that of powder 70 pounds. The force of impact at muzzle is 5,000 foot tons; at 800 yards, 4,400 foot tons; and the velocity on leaving the muzzle 1,360 ft. per second.

We enter into these details for the reason that they are such as to enable us to understand how the military objection to the use of circular towers has been in this instance overcome. To attack an incoming iron-clad vessel, a concentration of fire is, no doubt, necessary. But the concentration which was formerly effected by training the guns of a broadside, as of a bastion, to bear on a single point, is now produced by the more simple, certain, and irresistible means of firing the whole weight of a broadside from a single gun. Could the bolts of the 64-pounders be made to strike at the same moment, in exact proximity, on the side of a vessel, the shock would be very far less than that caused by the delivery of a like weight of metal in one mass; while as to penetrative power, the large bolt possesses it, and the smaller ones do not. They might pepper away very disagreeably at the sides of one of the giants that are now set afloat, without any very imminent destruction. But the large bolt will go straight through 12½ in. of iron at 200 yards, 11½ in. at 1,000 yards, and 10½ in. at 2,000 yards. These measurements of the offensive power of the armament of the forts enable us to form a very satisfactory estimate of their defensive strength.

On foundations supposed to have been pre-

pared with great care, will be raised first a circular mass of masonry rising to the height of 16 ft. above high-water level. On this will stand a closely-jointed iron tower, of the height of 26 ft., and the diameter, as before stated, of 200 ft. The skeleton of the structure is formed of piers of wrought iron filled in with concrete. Vertical ribs of iron form a sort of palisade round these piers, being bound together by three wrought-iron rings, and finally *planked* with great iron slabs, each some 26 ft. long. There are three several concentric thicknesses of these iron plates, each 5 in. thick; the two intermediate spaces, also 5 in. thick, being filled solid with concrete. Under the port-holes, however, the thickness of the iron is increased to 17 in., with 10 in. of concrete. A bomb-proof roof covers the upper gallery, which runs round the inner part of this tower, on a floor of iron beams and concrete, to support the upper tier of guns. We can only hope for the sake of posterity that the effect of concrete on iron is fully understood.

This enormous mass of iron, of which the skeleton alone weighs 2,500 tons, is so delicately and accurately fitted together as to form a homogeneous whole. Every face joint is planed, every hole drilled. If it cannot entirely be said that neither hammer nor axe nor any tool of iron will be lifted up upon it while it is in building; yet, that assertion will in a certain sense hold good: indeed, in the same sense in which it applied to that famous temple fortalice dear to masonic tradition. Not a chip will be struck from the iron. It will all go together like the pieces of a watch, or of a rifle made by machinery. Hence any impact of shot or shell will be resisted, not by the surface struck alone, but by the whole immense weight and metallic elasticity of the entire tower. The enchanted castles of fairy tales are as nothing in face of this giant baby of modern metallurgy.

These noble iron forts will be accompanied by the minor protection of land batteries at Southsea and Gillecker, at the Needles and Hurst Castle.

We may be pardoned for one word as to the strategic importance of a series of works, as to the engineering qualities of which we have spoken. We cannot doubt that it is of the first order. We have to remember that for 800 years the sea has been to England a bulwark and a safeguard. On two occasions only since the Norman Conquest has this island been seriously menaced by a foreign foe. On each of these occasions our assailant was able to dispose of almost all the resources of that part of the Continent from which we could be readily attacked. The winds and the tides, with which even Julius Cæsar shunned a third time to contend, shattered the great Armada on our shores. The flotilla of Napoleon, if, indeed, it was more than a feint, as to which military writers are in doubt, was never able to put to sea. In this, the safeguard of the past, lies all the reality of our protection for the present.

For this reason, without prejudice to the importance of girding London with a chain of detached forts, and of protecting Chatham on its only vulnerable point, the hills on the left bank of the Medway, it is of vital importance to the safety of the country to have impregnable harbours in which our fleet may lie in absolute safety, ready to issue at any moment to sweep from the Channel an invading flotilla. For the Sussex coast, the point struck first by Cæsar, and then, eleven centuries later, by William, Duke of Normandy, Portsmouth is suited to fulfil this condition. With Portsmouth that which she is in course of becoming, no enemy will be able to throw a shell into her harbour. Resting on this perfect base, our fleet may be well able to answer for the inviolabitity of our coast south of the Thames. With regard to the Norfolk coast, a second Portsmouth would be desirable. We conclude that the Thames itself would be the station for the division of the fleet that had to defend this portion of our coasts. Portsmouth is our great defence against France. As to our defence against Germany, it is only about a twelvemonth since we have begun to feel that it is a duty to be provided.

While feeling that, in the present state of military and naval warfare, defensive measures like those which we have described are a wise and sound economy, we see no reason to depart from the opinion which we have before expressed, that the present form of seagoing bottoms is of an essentially temporary character. Two distinct considerations led us to form this estimate; and the course of events during the past eighteen months has not only confirmed its accuracy, but gone far to turn opinion into certitude. One of these is the historic view. The amount of thought, science, and admirable workmanship that was expended, more especially by the armourers of Milan, in forming a perfectly safe, and at the same time very flexible, panoply for the defence of the person of the warrior, and a panoply of altogether different nature for the tournament, cannot be imagined by those who have never examined the actual suits worn by kings and nobles in the fifteenth and sixteenth centuries. A mode of attire that was at once consecrated by the use of generation after generation, and eminently handsome and noble, disappeared altogether in a few years before the improvement of projectile force. If this was the case with personal armour, how much more strong is the probability that a similar course will be followed by armoured ships, in which the mechanical laws of flotation operate as a positive limit to the thickness of the plate,—a limit beyond which one offensive power has already sensibly advanced. Add to this the fact, that it is not the strife between gun and target alone that must be regarded, but the irresistible force of that great guardian of forts and harbours—the *torpedo*. We feel convinced that the form of the war navies of the future must be altogether different from that of the strongest existing vessels, in which, when attacked by such torpedoes as we already make, the immense weight would only serve to ensure instant and total destruction.

Notwithstanding this progress of science, it may be hoped that the outlay on the Portsmouth forts has been wise and satisfactory. Not only were all the details of these structures to a great extent determined before we had gained our present experience of torpedo action, but even were the case now to be decided, we should do well to pay a million or two extra for the mere sake of the moral effect, both on ourselves and our possible opponents. The fall of 1 per cent. in the price of Consols—to say nothing of the much larger amount of railway and other stocks,—would be a loss of six times the cost of rendering our chief arsenal impregnable. It may be urged that such a depreciation is only an imaginary loss,—that it is a debt we owe to ourselves, and a mere removal of money from one pocket to another. But the reply is, that the fall in the price of public securities is an index of the loss of public confidence, the effect of which is the arrest of enterprise of any description. When we know how a marked fall—say of 8 or 10 per cent.—is enough to paralyse trade, commerce, and manufacturing industry, we may easily believe that slighter depreciations of value represent diminutions of our productive action, of at least a magnitude equal to their own. To pay, then, a few millions more or less by way of insurance, in rendering our coast service, our fleet, not only seaworthy, but supreme; and our army that useful organ for which it offers an unsurpassed material, if only it be wisely organised and trained, is not only a penny wise, but a pound wise, economy. Regarded in this light, we congratulate the country on the well-organised defences now in course of completion at Portsmouth: while as a specimen of the art of the builder working in new material, to bid defiance to colossal engines of attack, which two years ago might have been well regarded as irresistible, we feel greatly proud of the iron fortifications that Manchester frames to guard our fleet.

EAST GREENWICH WORKHOUSE.

UNDER the title of "Christmas under the Poor Law," the leading journal gave, some time ago, an article concerning thirty-two of the thirty-three unions in the metropolitan poor-law district. The one union of the thirty-three "conspicuous by its absence" is, singularly enough, that which includes two of the three towns—Deptford and Greenwich—represented in Parliament by the Right Hon. W. E. Gladstone, Prime Minister. The article in question contained statistics of varied character, embracing the number of houses, the number of inhabitants in the various unions at 1861 and 1871, the workhouses at which the inmates had egg-flip in the evening, and snuff and tobacco, and half ounces of butter, in addition to statements of the quantities of beef consumed, and of the ingredients of the plum-puddings prepared. It is too late now to describe the Christmas treat in the Union Workhouse at East Greenwich, but a few particulars of the establishment will not be out of place.

It is not necessary to quote statistics largely to show that the Greenwich Union House is entitled to a place among the others of the metropolitan district. In locality the union is an outsider, but in extent and numbers it is a fair average example, and entitled to mention. It has a total population of 100,601 in the union, and has 851 inmates in the union workhouse. Among the others enumerated by the *Times*, that have larger numbers of either population or poor, are:—the City of London, with a population of 111,784, and 2,390 inmates of the house; Marylebone, with 159,169 in population, and 1,874 inmates of the house; St. Pancras, with 221,594 in population, and 1,610 inmates. On the other hand, showing smaller unions, with lower numbers of populations and inmates of the houses, there are Chelsea, with 71,086 population, and 523 inmates of the house; the Strand, with a population of 42,978, and 916 inmates; St. George's-in-the-East, with 48,235 in population, and 1,051 inmates; and Whitechapel Union, with a population of 78,970, and 836 inmates. We do not know how the elder children are dealt with in the several instances just referred to, but there are in the Greenwich Union Workhouse 66 children; and at the educational and training establishment at Sutton, 357 children chargeable to the Greenwich Union. The inmates of the Greenwich Workhouse, are at present 851, consisting of 320 males, adults, 465 females, and 66 children.

The assemblage of buildings constituting the establishment is Elizabethan in style, of white Suffolk brick, with stone cills and lintels, and was erected about thirty-six years ago. It does not provide a palace, as regards external appearance or internal decorations, but embraces such healthy and cleanly accommodation as is necessary for the shelter and maintenance of the helpless poor. A considerable space is left vacant, as garden-ground and forecourt, between the front buildings and the public road. The entrance is through a block appropriated to the Board-room, and a number of offices. This building is in two stories, and is flanked on each side by two other ground-floor structures, used for miscellaneous purposes. Behind the front block is an extensive quadrangle, one side of which is formed by the main building, and by long wings, which intersect and project upon it, without joining at the ends. The principal building consists of a basement, a ground floor, and two upper stories for dormitories, infirmary-rooms, day-rooms, &c. The entrance to the house is in the centre, close to which is the master's and other offices, and the dining-hall, which is used on Sundays as a chapel. A circular staircase, under a campanile, gives access to the rooms of the master and matron, and to the long corridors upon which the dormitories and infirmary and day rooms open. The number of cubic feet of air per inmate in the dormitories, the day-rooms, and the dining-hall, is in accordance with the ordinances of the Poor-Law Board. The statutory accommodation in the house is for 850 persons, we believe, and it contains at present just one over that number. Having gone over the whole house, however, we feel justified in saying that there is no evidence of crowding.

Mention has been made of the 400 Greenwich Union children that are at Sutton; but there are children chargeable that are too young to be sent thither, and about twenty will be found in the house.

Poor little waifs, three of them have been picked up in the streets! Who can foretell their future? They are all clean, happy, rosy, and bright-looking now, whatever their after lot may be. They are so young as not to have reached the age when dress indicates the sex of the wearer; but the mode of parting the hair and a little head ornament marks the girls.

A visit to a workhouse suggests melancholy reflections. It is humbling to note such a low form of human life,—in many instances it is mere existence, not life,—an unvarying round of eating, maundering, sleeping, dozing through an existence that has ceased to have use, aim, or object. It is curious to notice the effect that the workhouse *régime* has in prolonging the lives of those who may have often survived hard buffetings in the world. Anxiety and care concerning the future are thrown off at the entrance to the house, and the inmates are henceforth placed under conditions more favourable to health and longevity than they have ever before experienced. In the Greenwich workhouse there are 431 inmates that are over sixty years of age, and of these more than fifty have seen more

than fourscore years. Several have reached the verge of a century of life, and one, Thomas Taynton, of Bristol, who has been an inmate for four years, has passed, it is asserted, his 102nd birthday. These old persons of both sexes furnish startling illustrations of Shakspeare's marvellous text descriptive of old age and its infirmities, and of the "labour and sorrow" attaching to life beyond fourscore years. How true the descriptions of the aged as they are seen here! "The moist eye, the dry hand, the yellow cheek, the white beard, the decreasing leg, the increasing belly, the broken voice, the short wind, the double chin, the single wit; every part blasted with antiquity." The poor creatures can only drowsily answer shrieks in their ears by piping a childish treble, and in their pitiable second childishness are "sans teeth, sans eyes, sans taste, sans everything."

We heard good things said of Mr. and Mrs. Kilbey, the master and matron.

LONDON AS IT IS, AND AS IT MIGHT BE.*

IN taking as the title of my paper, "London as it is, and as it might be," I am perfectly aware that I am choosing a colossal subject, and one which I can only hope to treat in a very cursory manner in one short paper.

In many respects there is no city in the world to be compared to London. Its vast extent and population, and its boundless wealth, form an inexhaustible theme for its panegyrists, and it would be perfectly absurd to compare any city, ancient or modern, with it in commercial importance and activity. Even in natural situation it is to be doubted whether many cities excel London. Whether we look at the central parts, rising by a gentle slope from the bold curve of the river from London to Westminster, or the natural beauty of the suburbs round the heights of Hampstead, Highgate, or Sydenham, or along the banks of the Thames as far as Richmond; and yet, with all these advantages, it cannot be denied that London is not so attractive as it ought to be. If to any one, one would think this place would, at least, be interesting to Americans, who draw their blood and their language from "Old England." But Americans will come here, rattle through the chief sights of the place as a matter of duty in a few days, and then rush off to spend the bulk of their time and money in Paris; and no wonder, for, compared with the gay and cheerful French capital, our London looks a dirty hole indeed. No one who wishes to pass a pleasant existence, with those advantages which are only to be obtained in a metropolitan city, would hesitate to choose Paris in preference to London, unless, indeed, the chance of being knocked on the head was thrown into the scale; then, perhaps, he might decide in favour of the latter.

It will not be out of place, then, I think, in an assemblage like this, which represents the architects of the future, to consider why this our city (which we justly and proudly consider the queen of the cities of the earth) compares so unfavourably with some others in external appearance; and if in the paper itself, or in the discussion which follows, we are able to ferret out any of its defects, and suggest any remedy for them, the object of bringing the subject forward will be answered.

I will divide what I have to say under four heads, as follows:—

First. London is abominably dirty, and there is no reason why it should be so dirty.

Secondly. It is much more smoky than it ought to be.

Thirdly. The general aspect of its streets,—even the principal ones,—is commonplace, uninteresting, and even ugly; and, compared with the advantages gained, a very trifling expense would make an astonishing difference in this respect.

And Fourthly. There is a want of uniformity of plan,—general supervision, from a fine-art point of view.

Now, as to the first head, by saying that London is dirty, I mean that it is dirty far beyond what it needs be. A certain amount of dirt we must always expect in every large assemblage of houses and human beings; but in London everything is dirty. How many of its buildings are so blackened by smoke, with their mouldings and cornices so choked up with the dirt of years, and in some cases of centuries, that the effect intended by the architect is quite lost? How soon do its monstrous rows of brick-built houses assume one even tint of dirt? Even the trees seem only to assume their natural colour after a good shower of rain. The air is so full of dirt that everything is covered in an incredibly short time with a thick coating of dust; and as to the streets, an hour or two's rain is sufficient to convert them into a liquid sea of filthy mud. Now, the question is,—Is all this dirt absolutely necessary? Is there any reason, in the nature of things, why the dirt and smoke should have been allowed to accumulate on St. Paul's, for instance, apparently ever since it was built, without being once removed? Would it be sacrilege to give a good cleaning to the beautiful spires and spirets in the City, the details of which are quite hidden by dirt? And why is the Mansion House the only building which is allowed an annual washing? This simple cleaning alone would quite alter the aspect of many views in London.

Then, look at the streets. A very few hours of rain are sufficient to make the evil appear. They are soon covered with a thick dirty mud. If the rain keeps on, this becomes more liquid, and is worked up by the cabs and vehicles into a regular slough. As these rush through the streets, they scatter the mud right and left over the unfortunate foot-passengers. These last transfer the mud from the road to the footpaths, and from thence into the houses, until the dirt and filth of London in wet weather has become proverbial. As an example of the mischief arising from this cause, I may mention that a few weeks ago I attended the service at St. Paul's on Sunday afternoon. It was one of those miserably wet days. The statues had just been thoroughly cleaned, I believe, for the first time since they were put up; and the crowds were being admitted by the west door; but, with that wisdom so characteristic of ecclesiastical authorities, no mats or scrapers were provided for those who entered to clean their feet, and the dirt from the streets outside was being rapidly transferred to the marble floor, there to dry, and to be afterwards ground up, and transferred, in due course, in the form of dust, to the lately-cleaned statues and other parts of the building.

But if the public buildings and the chief streets are dirty, what shall we say when we come to the back slums? What about the neighbourhood of Shoreditch and the New Cut? Those who have been employed on surveys or valuations in the back slums of London, may have seen those filthy little cottages, where each room is the dwelling-place of a family. At the window, on a board, sits the bread-winner,—perhaps a tailor or a shoemaker; the window has not been opened for years, or is nailed down, the panes broken and stopped up with wood, paper, or dirty cloths,—a miserable, squalid bed in the corner forms the nightly resting-place of father, mother, and sickly children, whose wizen features and rickety limbs are pitiable to behold; whichever way you look,—floor, walls, or ceiling,—dirt, filth, you find on every side, and you rush out from the foul air with a feeling of intense relief;—those who have seen sights like these alone have some idea of the real dirt of London; but I leave these back slums for very despair at present, and will only speak of the chief streets and buildings. If the salt has no savour it will be in vain to try and season the whole lump; and I say that it is absolutely impossible to materially improve the aspect and cheerfulness of London, or make it vie in appearance with a city like Paris, till some thorough and frequent system of cleansing is adopted both of streets and buildings. The first and urgent want of London is cleanliness; and cleanliness we shall never have till public attention is thoroughly awakened to the evil, and the present condition of things is considered insupportable. Then, perhaps, a commission might be appointed to see why London is the dirtiest capital in the world, and some measures might be adopted for its continual cleansing. At present the dirt seems to be regarded as an evil which cannot be cured, and must be therefore endured. Some of the measures which might obviously be adopted are as follow:—Materials ought to be employed for the streets which experience has proved to be the most cleanly, such as the asphalte and wood paving; and the streets and footpaths should be thoroughly cleansed as often as found necessary, the present staff for this purpose being at least doubled or trebled. More materials should be employed in the façades of streets which can be most easily cleaned, and every building of any importance should be thoroughly cleaned at least once a year. What is the use of spending thousands of pounds in elaborate carving and ornament, and then permitting it to become merely the lodging-place of soot and dirt?

As a cleanly covering for buildings in a large town, I hold that the much-abused stucco, which can be painted as often as wished, holds a very high place; and Regent-street and the buildings round Regent's Park are certainly the most cheerful and clean-looking in London. But I do not wish for this reason to suggest building London façades in future with stucco fronts as the perfection of street architecture. Indeed, what I have to speak about under the head I am now treating of is not so much the erection of new façades as the keeping clean of those already built, and in this respect stucco has great advantages; and I believe I shall carry the Association with me when I say that if those who had the charge of the streets and footpaths kept them as clean as they might be kept, and those who had the charge of public buildings did the same, and that if each private owner of a house in a street-front were compelled to give his house a thorough and frequent cleaning, whether it were stone, brick, or plaster, a great step would be obtained towards altering the character and cheerfulness of London; and if the saving of things now constantly spoilt by dirt were taken into account, the measures adopted, even though expensive at first, would probably be found economical in the long run.

With regard to the second head,—that London is much more smoky than it ought to be,—I think there is no one in the audience will disagree with me on this, though the remedy may be more difficult to suggest than in the last case. On coming up by train from the country on a bright spring morning, with blue sky overhead, we notice a haze hanging over the horizon towards London as we approach the great metropolis, and, finally, the clear blue sky and pure air may be said to entirely disappear when we are whirled into the heart of the town. A really clear blue sky is never seen in London; there is always to be noticed a haze and dimness about it quite different from country air. Some one will say, perhaps, that this is a necessary evil, and one of the natural results of life in a large city; but anybody who has been accustomed to walk about Paris must have noticed that the air there seems quite as pure as country air, and everything in the best quarters looks fresh and clean from the sky down to the houses in the streets, except perhaps now where damaged by the shells of the Germans, or the fanatical hands of the Communists. It is almost impossible for us to tell how many ills we Londoners owe to this Hydra smoke, belched forth incessantly from hundreds of thousands of fires. It fills the air with soot, carbonic-acid gas, and other unhealthy products. It forms a large proportion of the dust which flies about ruining everything. It injures our lungs, and injures our eyes; it eats its way into our pictures and colour decorations, and entirely prevents the possibility of any general view of London being obtained. From the top of the Monument, or St. Paul's, on a calm day, the glorious prospect of industry and wealth rattling through the streets below, or carried on the bosom of old Father Thames, or attested by those forests of masts in the docks, is bounded in a mile or two by the sulphurous cloud which enshrouds everything in its arms. On a very windy day you can see farther; and when the wind shifts rapidly from point to point, it is curious to notice the smoky giant rolling first on to one and then on to another quarter of the City, the spires and prominent buildings of which alternately appear and disappear from view.

The smoke generally appears to cling pertinaciously to the town itself, so that the heights round, such as Highgate, Hampstead, and the Crystal Palace, are often visible, whereas the intermediate parts cannot be seen. What general views of London would be without smoke can be sometimes seen on a Sunday bright summer's morning, when scarcely any fires are lighted. I have sometimes been quite astonished at the beautiful views which have appeared from Richmond and the high part of Epping Forest; at such times giving general and beautiful views of the City which it would be impossible to tell existed at ordinary times. I was once told by a friend who had chambers in Pall-mall, and whose bedroom was a top room at the back of the house, that if he woke up on a summer's morning at three or four o'clock

* By Mr. A. Payne: read at a meeting of the Architectural Association, January 12th.

and looked out of the window, he had a clear and distinct view of a great part of the town; on looking out again, however, at six or seven, this had totally disappeared, and he was merely greeted by the smoke from the chimneys of the lower houses. It is this smoke, too, which forms a great part of the dust and black specks complained of under my last head, spreading a fine coat of dust and gloomy colour over everything they touch; and that it is prejudicial to the inhabitants is proved by the fact that those who have been bred in town two or three generations back lose vigour and stamina, as compared with those in equal circumstances in the country. But we have not done with the evils of smoke yet. Who does not know what a plague and nuisance a smoky chimney is. I have known more than one London architect's office where the draughtsmen have been obliged to sit in their great coats and gloves, in the middle of December or January, or else endure the alternative of being gradually smoked. Then comes the smoke doctor, that nightmare of the architect, with his horrible twisted chimneys, zinc cowls, and other abortions, all warranted to cure, and "very handsome," according to the patentee's notions. These horrible things form an eye-sore in every street, and damage almost every architectural view in London. Let any one go on to Waterloo Bridge, and look at the noble and stately front of Somerset House, crowned with long rows of chimney-pots of such motley description that one might fancy that all the smoke doctors in London had had a turn at the building.

"Ah!" says the Gothic architect, "that is the fault of your Classic style, quite unsuitable to this cold climate, and to which chimneys cannot be adapted. In Gothic architecture, chimneys are a positive improvement." Are they, my Gothic friend, lover of realities and hater of shams? Come with me a little further down the river, and look at the Temple library. Yes, those are very pretty chimneys, those at the sides, but they are never used, because they were found to smoke. I think you will hesitate to say that those ugly zinc pipes that climb up the roof (forming some of the most untidy chimneys in London) are a positive improvement.

I think it must be conceded, whichever way we look at it, that this smoke is a nuisance which ought to be abated; in fact, next to dirt, the crying evil we have to call out against in London is smoke: and, as in the former case, we shall never be rid of it till the public is persuaded that London is more smoky than it ought to be, and gives battle to the Hydra with that dogged determination to conquer which the British public generally does show when fully alive to an evil. Even then it would take months of discussion, and the brains of our scientific men would be severely taxed before we should have an answer to the question,—How can we have heat and warmth without smoke, or with much less smoke than we have at present?

I believe this question has never been thoroughly and satisfactorily solved, though much has been written on the subject.

One of the chief methods which have been proposed to reduce the evils of smoke is improved grates and stoves, by which the amount of air supplied to the fire is regulated, and wasteful combustion prevented; and there is no doubt that a great deal might be accomplished in this way, and that it is a very important part of our duties as architects to study this subject, and see that our clients are provided with economical grates; for half the smoke and soot flying about in the air is nothing but wasted fuel and heating power lost. Closed stoves, no doubt, give less smoke than open grates; but it is to be doubted if Englishmen will ever give up their cheerful fireside for an ugly black stove. The same objection applies with equal force to heating by steam or hot water; and although an open fire often bakes you on one side whilst you are almost frozen on the other, still a bright blazing fire is a nice thing on a cold winter's night, when the snow and hail are beating outside, and not lightly to be given up.

In New York anthracite coal, or coal without bitumen, is used to prevent smoke with great success; and it seems strange that in this country coal should be prohibited on railway engines, where very little damage would be done by it, and be allowed in large towns where its effects are so disastrous. In Paris, at no very distant period, wood was burnt for fuel; and I remember an anecdote which shows how deeply-rooted was the antipathy of the fair Parisians against coal. One of our English ambassadors, newly appointed to Paris, determined to set a good example to the inhabitants by burning coals instead of such an obsolete fuel as wood. Shortly after his appointment, he held a grand assembly, but was mortified to find that hardly any of the fair sex attended; they had heard that his excellency burnt coals, and fearing that their complexions might be spoiled, they stopped away. Whether complexions so susceptible were natural or artificial it is not necessary for our purpose to inquire: the moral is the same. No doubt, one of the most feasible plans for reducing the smoke-nuisance, would be to make regulations as to the sort of fuel used, and by advocating the use of coke and iron-bituminous coal wherever possible.

I hope I shall not be thought Quixotic in mentioning another scheme which has been hinted at in engineering circles. Those members of this Association who have been into the iron and coal districts, may have noticed some of the iron furnaces belching forth large quantities of flame and smoke, whilst others, which they are told are hard at work, they would imagine to be out, by their giving forth so little. Now, what is the reason of this difference? Simply that the owners of the latter class of furnaces have found out that by throwing away so much flame and smoke, they are wasting a great deal of heating power, and they collect the smoke and gases at the top of the furnace, and bring them back again for heating their boilers and other purposes. Is it not therefore possible, that if all the unconsumed matter which flies off in smoke in a vast city like London, were in some way collected and made use of, a very great saving would be effected, and the nuisance of smoke almost entirely obviated? The scheme, as I have heard it shadowed forth, is something of this sort. Every block of houses would be provided with one or more smoke towers, into which the flues would be taken by descending or ascending flues as most convenient, with openings at intervals for sweeping. In the smoke tower, the smoke would be either burnt or utilised.

The advantages which could be afforded by this plan, if it could be brought from the level of mere suggestion to a practical scheme, are obvious, and there seems no reason why it should not answer as well for a block of small buildings as for one large one, or a factory, where it has often been carried out. In addition to carrying away and neutralising the smoke now thrown into the air, it would be a fatal blow to smoky chimneys, and the smoke-doctor and all his tin chimney-pots would be annihilated, for smoky chimneys are almost always caused by a down-draught on a chimney from some roof or higher point. The smoke-towers would be a fine opportunity for varied architectural design, and such blunders as the chimneys of Somerset House and the Temple Library would be unnecessary in the future. And with such powerful extraction shafts as the towers would be, we should have much greater chance of thorough ventilation for our houses, public buildings, and sewers, than we have at present.

I think I have now mentioned all the different proposals that have come under my notice for abating the smoke nuisance; perhaps some of the members present will be able to suggest others. At all events, I hope they will agree with me that something ought to be done. It is a scandal that the inhabitants of New York and Paris should keep their cities, comparatively speaking, free from smoke; and we, who consider ourselves in advance, or, at least, abreast of our neighbours, should permit the atmosphere of our city to be so polluted as it is at present. London never can and never will be a really pleasant place to live in till it is far less smoky than it is at present.

But I must now pass on to my third head.*

* In our next.

THE DEMOLITION OF THOROLD-SQUARE, BETHNAL-GREEN.

THE houses forming this square, to which we have repeatedly drawn attention in the pages of the *Builder* during the last quarter of a century, are condemned at last, and are now in course of demolition. If ever a parish swamp and fever-nest existed in this metropolis that knew no intermission in the sad havoc it made of human life and human morals, that hot-bed in the heart of Bethnal-green was one. Yet for years the local authorities allowed it to exist, though its public shame was monstrous, and the dwellers within that ill-fated square were living and breathing in daily contact with the infectious dead. Its state twenty years ago, ten years ago, and last year, was nearly similar, but its latest phase was worse in one particular,—that the houses in the interval had grown older, and become absolutely uninhabitable. Here is the picture of the sanitary condition of this place of ill omen given in the *Builder* nearly a dozen years since:—

"At one inquest it was stated that, in twenty-two houses forming Thorold-square, twenty children had been attacked with illness, and that twelve of these had died. The Roger family occupied one room, and were ten in number,—eight children and the father and mother. Here, even without any other cause, overcrowding was sufficient to produce pestilence; but George Stratford, a weaver, tells us that there had been no water supplied to any of the houses but three for eighteen months, except through a broken and unusable pump. In the heat of summer they never had a pailful of water at any time for three weeks except what they begged from others as best they could. The closets had no pans and were not trapped;—in fact, they might be called cesspools;—sometimes they were empty, but he had seen them running over with soil. There were sixty families in the square, and about 350 children among them."

From 1860 to 1871, Thorold-square mended but little indeed in its water supply or closet accommodation, if we were to judge by a personal visit we made on two occasions last year. It was then simply disgusting to view the court-yard around, an open sesame into which the side channels of one side of Bethnal-green drained down a pretty steep gradient, carrying unmentionable filth and sewage to the very doors of those wretched tenements. The closets or perches, or by what other name they could be rightly termed, were indescribable;—the ash-pit or bin overflowing, and the middle of the square, or rather its whole length, one spread out dung-hill. Sickness was still rife in the wretched abodes; the children were ragged, barefooted, bareheaded, and hungry, and not a few of them had the shrivelled and hardened features of old age. The aged were ghastly pale and broken down, and possibly broken-hearted; for how could they be otherwise, condemned in a manner to live as they were?

Is it not a mercy that such a slaughter-yard is abolished at last, though we hope at the same time that the evicted have found a housing of an improved kind near at hand to the centre of their employment. The houses that backed against the square on a line with Turin-street, and which, of course, formed a portion of this square, are being demolished also as we write.

Let it not be imagined that in the destruction of this villainous house property Bethnal-green gets rid of her worst evils. There are various other streets, lanes, and courts quite as bad, as we have long since instanced. Such as Nichols-street Old and New, and Half Nichols-street, Phœnix-street, and several other narrow and crooked defiles extending from the back of Shoreditch Church to a considerable distance eastward—right and left of Bethnal-green-road. In the demolition of Thorold-square a tablet with its name bearing date 1792 will disappear. The houses looked much older than that date would indicate.

SNOW-MELTING.

The first fall of snow this season in the metropolis must have awakened in the minds of many inhabitants vivid memories of the almost total stoppage of traffic which occurred two years ago, when the heavy fall so rapidly accumulated in the leading thoroughfares in such a manner as to extinguish all locomotion except of the slowest and most expensive description, and defied all the efforts of the contractors' brooms and shovels in carrying it away. *Then* the removal of snow was the general topic of conversation, and induced the Commissioners of Sewers of the City of London to advertise a competition for snow-melting machines. Among those who tendered designs was Mr. J. F. Clarke, of Moorgate (and to whom the 1st premium was awarded), who perfected an invention which he has patented, and which he considers fully able to grapple with and overcome any difficulty that may ever arise through such accumulations. Mr. Clarke does not propose to carry the snow to some far-off point, but, by a great concentration of heat at frequent places, anticipate the work of the wished-for sun. His patent consists in the employment of a series of metal slabs or plates heated by gas and air jets, and placed at an inclination of 2° to 1 ft. in a chamber or vault beside or over a sewer or drain. Upon

these heated plates the snow is thrown, and so melted, and the resulting water discharged into a sewer. The apparatus was put in operation last year, under the supervision of the City engineer. The entrance to the vault can be easily made as a vertical shaft in any of the "side openings" usual to sewers. This vertical shaft is the shoot down which the snow is sent to the heated plates prepared to receive it. The advantage of the apparatus being placed in close proximity to the sewer is apparent, as an easy junction with the gas mains can be effected, and the apparatus itself offers no obstruction to the traffic. But to meet the exigencies of small towns, or any unforeseen circumstances in large cities, the apparatus is constructed so that it may be easily placed in a portable casing, and placed over any gully or other entrance to a sewer, and there perform its work. The cost in the City was ascertained to be from 5d. to 6d. per yard for destroying the snow without any extra street labour. If the same quantity had to be carted away, it is calculated the cost would be from 3s. 6d. to 4s. per yard, even supposing the horses able to travel.

The second prize for a scheme for snow-melting has been awarded by the Commissioners to Mr. J. S. Farrar, who proposed that the snow should be swept up to the centre of wide streets and the sides of small ones; then to be carted away, and thrown into the Thames, vacant spaces, the main sewers, and into heated troughs. Similar propositions were made in our columns long ago.

Mr. William Haywood made a report in 1871 on some experiments in melting snow, wherein he speaks somewhat favourably of Mr. Clarke's scheme. Mr. Haywood remarks, suggestively, in that report—"The recent snow-storm is the first to cause public inconvenience since 1867."

ORNAMENTAL GLAZING QUARRIES.

AT a recent meeting of the Yorkshire Architectural Society, the Rev. G. Rowe read an interesting paper on this subject. He observed that a very moderate acquaintance with the works of Mediæval artists was sufficient to excite our admiration at their singular fecundity of design; and the present subject afforded one of the many branches of ancient art by which the richness and variety of thought might be illustrated. In the general revival of the study of old stained glass, attention was attracted by that more manageable part of the subject which is understood by the term "ornamental quarries." After explaining the meaning of the word "quarry," he observed that the form of the quarry was a diamond, or sometimes a square put diamondwise. It was also necessary that ornamental quarries should each contain within itself a separate pattern or device, since, as it often happens when the design occupied many adjacent quarries, the kind of glass is distinguished by the name of "Running Pattern" or "Grisaille Glass," much of which still exists in this country, and is very beautiful. The size of the pieces of glass which are called quarries has made them liable to vicissitudes peculiarly their own, and their number diminishes yearly. The common accidents of breakages, and the fragility of their material have been the chief causes of destruction; while, in more recent times, on the one hand their apparent insignificance has led to their being replaced by new glass; and, on the other, their easy portability has too often been practically put to the proof by over-zealous but not over-conscientious collectors of ancient fragments. But, notwithstanding, ornamental quarries are, even yet, sometimes found by the score. In such cases they may have formerly filled the windows of the church where they occur. These, however, are the chief dishes of the feast. More commonly only a few miscellaneous examples have been preserved. In some praiseworthy instances these have been carefully set aside upon the restoration of the building, and afterwards grouped together in one window, in a situation where the quarries could be easily inspected. It is also probable that in some cases we possess the only representative of the type that ever existed. The initial letters of the name of either donor or painter, or some canting allusion to it, seems to have been placed in a single quarry, perhaps at the bottom of the window, and to have survived all mishaps. These are extremely difficult to attribute to their rightful possessors unless some chance directs conjecture to the truth. Among other specimens Mr. Rowe referred to one in St. Martin-cum-Gregory's church, with the letters C. R. upon it; and a square quarry containing a trefoil on which are the letters J. E. W., in Holy Trinity, Goodramgate, both of which wait for some one to unravel the mystery. He observed that there are but slender means whereby to judge of the age of quarries. Coarse rough glass of deep green colour is usually an indication of early date. As times went on they used better materials, or more probably melted them more thoroughly together, which caused smoother and cleaner glass to be manufactured. Its uneven thickness remains in old glass throughout, and at the same time forms its chief distinction from the modern materials, and also causes it to be more sparkling and gem-like. He observed that quarries are rarely found *in situ*. The case with which a small independent piece of glass could be moved from one window to another manifestly conduced to this scarcity of examples in their original place in York. A handsome ciborium occurs at the Minster and in St. Dennis's. In the latter church is an Early Decorated window, having quarries for the background, which is surrounded by a border having a double rose, whose inner petals are yellow and the outer white. At St. Michael-le-Belfrey's is a curious grotesque representing a monk, armed with a sword and buckler, attacking a fabulous monster. Similar subjects often occur in the other work about the middle of the fourteenth century. In St. Martin-cum-Gregory's, York, is an interesting example of a quarry found in its original situation. The windows on the north side had been given by one person, probably a city merchant, whose mark appears in the border, accompanied with the letter R. There is also an R in a quarry in St. John's, Micklegate, of the same date and workmanship. Mr. Rowe next explained the method of arranging the quarries, which admits of a three-fold classification. The most frequent plan is to fill the whole inner space with quarries only, generally of one pattern, but sometimes with two, or even with an indefinite number of designs. Two of the south-aisle windows in St. Mary's, Castlegate, had, previous to the late restoration, the glass in the tracery untouched. It was composed of quarries of more than one pattern, with a plain white border; and in the centre of the lights were circles. These circular pieces contained crowned monograms of the sacred name of Jesus and of the name of the Blessed Virgin. In some instances the quarries are separated by a narrow band of richer work, producing an excellent effect. He gave several illustrations of this mode of arrangement, which always looks well. The third mode of dealing with them is where a considerable portion of the window is occupied by some picture subject, and the quarries are only used to fill up the empty spaces within the border. This practice especially indicates Perpendicular work; less often Decorated; and rarely if ever Early English. Instances of quarries being used as a background occur in St. John's, Micklegate, where a spiral pattern of four hawthorn leaves forms a ground to a picture containing figures of John Randman and Johanna, his wife. Another example has quarries set square-wise, bearing alternately a lion and an eagle. A latter instance is one which is coarsely drawn with eight small trefoils or points round a circle, and composes the field of a kneeling figure of Sir Richard York, who founded a chantry here, and died in 1498, being buried beneath the window. Other specimens are found in St. Dennis's, where the groundwork of a good Decorated picture window is formed of quarries bearing a cinquefoil. Mr. Rowe next observed that the form and size of ornamental quarries are liable to much variation. In York Minster there are some of gigantic size and corresponding poor effect, this being partly due to their devices, which are large and rambling, being indistinctly painted. The typical quarry presents a compact star-like design in the centre of a diamond, like that at St. Peter's, Norwich. A star of ten wavy points, at St. Martin's, York, is another good example. Some early quarries have a leaf springing from the bottom of the diamond. Graceful patterns are arranged by putting together four fleurs-de-lis; others are formed of four leaves, more or less natural. There are some examples of the first sort at St. Martin's, and of the second kind in St. Helen's and St. Michael's, Spurriergate. When the glass is of the full size and wants the border, it is a safe sign of the Perpendicular date. In the Renaissance period the border was again revived, but the imitation is easily detected, for the bounding lines are not continued to the edges of the glass at the topmost angle. In Holy Trinity, Goodramgate, is a running pattern, where the golden border is rendered opaque by mineral colour and a row of dots scratched out of it. The effect is very good. Indications of dates are also to be derived from the changes which may be noted in the character of the workmanship. Much of the bold effect of early work is due to the custom of covering all the ground of the quarry with hatched lines crossing each other. In Early English work and in the rare specimens which we possess of the Norman period, these lines are painted with hair-like delicacy. In the Perpendicular lines, on the contrary, they sometimes employed these hatched lines to deepen the shades of the design itself, thus forgetting they were ornamenting a flat surface, and the lines, although occasionally fine and flowing, are usually broad and coarse. A late Perpendicular border at St. Michael's, Spurriergate, is composed of scrolls, wound round a stick, which bears the letters "n. m. n. m.," simulating an inscription. The colouring of quarry patterns is almost entirely limited to the use of the golden stain, which was introduced about the year 1310. The brown outline is painted on the inside in a medium which dries sufficiently firm to allow of the glass being turned over for the reception of the yellow stain at the back. The whole is then subjected to the fire at once. Cases where the whole pattern is stained yellow are met with in All Saints', North-street. In one example from St. Dennis's Church, what is probably a quarry has the design left white upon a yellow ground, which is distinguished from the border by a slight smear shade. After noticing at considerable length other peculiarities in the workmanship and the design, he next considered the question of classification. He observed the numerous examples which bear a quatrefoil in the centre, and the multitudinous varieties of the cross, which was developed, so to speak, from a form of four small circles surrounding a fifth. There are also many conventional designs, of which it was extremely difficult to make anything at all. About the middle of the fourteenth century the more natural drawing of plants and animals commenced. Of the latter, the most common is the heart, one of the supporters of Edward IV., of which an example is preserved in All Saints', North-street. In York Minster is a dog, which is, perhaps, part of the arms of the Stapletons, of Wighill. At St. John's, Micklegate, and St. Dennis, are examples of what, at first sight, appear to be hornets, which is a Scripture emblem, but they are probably butterflies. Mr. Rowe next passed to the numerous representations of birds, which were especial favourites with the later quarry painters. As might have been expected, quarries were a convenient vehicle for the representation of heraldic devices, including, under that term, initial letters, monograms, and mottoes. In conclusion, Mr. Rowe added a few words on the subject of modern quarries. The general revival of picture windows and the creditable specimens of this kind which are now produced by our artists have greatly tended to check the use of quarries. Besides the introduction of the latter, made of cast-glass, and very cheap, has brought disparagement upon this method of ornamenting our windows, but nevertheless they may sometimes be used with advantage,—for instance, in situations where light cannot be sacrificed. Moreover, quarry-windows admit of much enrichment. For small windows quarries alone, judiciously chosen, and bordered with rich colour, compose an excellent arrangement, at a comparatively slight cost. In every case the patterns should be hand-wrought, and he added some advice as to the patterns.

SCIENCE IN BIRMINGHAM.

BIRMINGHAM AND MIDLAND INSTITUTE.

THE annual meeting of the members of the Birmingham and Midland Institute was held on the 8th inst. in the Lecture Theatre. Mr. W. C. Aitken presided, and made a valuable address, dealing chiefly with the growth and progress of the Institution, the necessity for science teaching, and Whitworth's munificence. Speaking of the latter, Mr. Aitken said,—

The Whitworth Scholarship suggests to me a more powerful argument in favour of scientific instruction than a whole wilderness of treatises written by *savans* on the subject. Before us

rises the grand fact, that one who in early life was only a working engineer, who by his own unaided industry and perseverance conquered his early difficulties and realised a princely fortune; grander still to think that of that fortune he gave freely, to aid and to help those who, like himself, "feel it hard to climb," to facilitate the acquirement of that which he felt the want of himself in his youth, and his after-life confirmed him in, viz., the want of science in connexion with clever manipulative skill on the part of English workmen. In this he was still further confirmed by a visit made by him to America in 1853. He there saw that the superior intelligence of American workmen enabled them to use machinery of a high order, to compete with which the scientific education of our artizans is absolutely necessary. Hence Sir Joseph Whitworth's munificent gift. He maintains the connexion between science and manual skill. There is no more wisely-guarded gift than his. In the students' competition, the student must, to a certain extent, be able to use tools. In the mechanics' competition the candidate must be an expert. In both competitions a certain amount of scientific knowledge must have been gained, for Sir Joseph Whitworth well knows from practical experience that these are the elements which united make the complete engineer, the able superintendent of a manufactory, and the perfect workman. Forty years ago Justus Liebig proclaimed to the world that the nation most quickly promoting the intellectual development of its artizans, must, by an inevitable law of nature, advance, whilst the country neglecting their industrial training must inevitably recede. This warning voice we heeded not. With abundant supplies of raw material, of mineral wealth to supply cheaply our great national industries, with workmen the best by far as regards muscle and clever manipulation, reckless and spendthrift-like we revelled therein, forgetting that cheap raw material can only for a time, in connexion with clever manipulation, preserve a monopoly, but only till a competing nation, by the education of its workmen, overcomes the difference in the price of raw material. This is distinctly proved by the competition we have been and are subjected to as regards manufactures, according to the Birmingham Chamber of Commerce; seventy-two branches of local industry are interfered with by the competition arising out of articles produced in foreign countries, where primary education, with a higher education embracing science teaching, is given to its artizans.

THE TRADES CONGRESS.

THE proceedings of the Congress held in Nottingham have been very fully reported, and will afford subject for comment hereafter. Amongst the matters discussed of especial interest to the working classes was a resolution of Mr. Hicklin in favour of a reduction of the hours of labour throughout the country in every trade, "as it would be beneficial to the nation at large, and thereby proper advantage would be taken of the facilities for promoting the course of education, reducing taxation, and giving work to the unemployed." This, after some discussion, was carried by a large majority.

Amongst other resolutions passed were these: "That in the opinion of this Congress trades' halls and clubs are highly essential to the interests of labour, as they tend to bring working men together in a manner better calculated to further their objects than other places now resorted to admit of; this Congress therefore cordially advises every trade society to take the subject into immediate consideration."

"That this Congress views with serious apprehension the unfair competition caused by the introduction of convict labour being crowded into the public market, and that the disposal of such labour should be confined entirely to charitable institutions which exist in this country." The mover suggested that subsidised labour of this kind should be supplied to deaf and dumb asylums, hospitals, the army, navy, and the police. This, he thought, would be better for all parties.

Courts of arbitration and the question of labour representation in Parliament were also debated, a resolution approving of the direct representation of working men being passed. In the evening Messrs. Seely, Herbert, Mundella, and Morley gave a *soirée* to the delegates, in the Assembly-rooms.

On a previous evening a crowded working men's meeting was held, under the presidency of Mr. Mundella, M.P. The Hon. A. Herbert, M.P., was also present. Mr. George Potter moved and Mr. Leigh seconded, "That in the opinion of this meeting trade-unions afford the best means of securing to the industrial population a just and reasonable share in the results of their labour as well as the rectification of the grievances under which they have long suffered." The resolution was carried, and a petition to Parliament determined on.

At the close of the Congress a meeting of the general committee was held at the Mechanics' Hall, Nottingham, to consider their mode of action for the coming session of Parliament, when Mr. Alexander Macdonald, of Holytown, Scotland, president of the Miners' National Association, was unanimously appointed president of the Congress Committee for the ensuing year. Mr. G. Howell, of London, was elected corresponding secretary for the Parliamentary Committee; and Mr. William Hicking, Nottingham, was appointed the provincial secretary of the United Trades Committee.

MONUMENT TO M. DUBAN.

A SUBSCRIPTION has been opened in Paris to erect a monument to M. Felix Duban, at the office of the Central Society of Architects, 23, Quai de l'Horloge, and at the École des Beaux Arts. A report of the proceedings on the occasion of the funeral of M. Duban, and the addresses then made, edited by M. César Daly, has been published, and will be found very interesting.*

PRIVATE BILL STANDING ORDERS.

THE commencement of legislative action in relation to the private Bills for railways and other works, which Parliament is petitioned to authorise by the conversion of Bills into Acts, in the session of 1872, has been entered upon with a scrutiny by Parliamentary authority into the proceedings already taken, and whether the requirements of Parliament have been complied with up to this point, by the promoters of private Bills. The examiners on Standing Orders, Messrs. Frere and Robinson, stipendiary Parliamentary officers, have thus commenced their sittings.

On the first day the examiners' lists embraced the first sixteen Bills on the general list, and contained six railway Bills, and ten others, each of a different character from the other nine; as for instance, the Aberdeen District Tramways, Abraham Kill's Trust, All Saints' Church, Cardiff, Bannow Slob Reclamation, &c. None of the Bills were considered of much importance, or expected to excite much interest. In numerous instances when Bills are called by the examiner, there is no appearance on the part of promoters, from failure to have lodged the deposit, or the abandonment of their respective schemes from some other cause. The proposed new line to Brighton is among the dropped Bills of the session.

THE EDUCATION OF THE ENGINEER.

TOWARDS the close of the address made by Mr. Hawksley on taking the chair for the first time as President of the Institution of Civil Engineers, an address which will be deemed by some retrogressive in parts, he made a few useful observations on the subject of professional education, addressing them, he said, rather to each one of the 200 students of this Institution who happened to be present, than to the members who had acquired and usefully employed that peculiar knowledge by which they are severally known and distinguished.

To the students, then, the President said,—1st. Of all things, do not attempt too much. 2nd. Keep up and augment your knowledge of mathematics and the applied sciences, especially of those sciences which are most needed in that walk of the profession which you have selected for your own path; but again, I say, do not attempt too high a flight, for if you do you will never become a practical man. 3rd. Do not let your French grow rusty, and acquire German, if your leisure and aptitude are sufficient for the purpose, because your future vocations may be in countries in which these languages are either habitually spoken or are in considerable use. 4th. Acquire in the office, and by the study of esteemed works, a knowledge of form and design. 5th. But bearing in mind that you will never become a practical engineer on theory alone, take every opportunity which presents itself of becoming apt in surveying and levelling, and in the methods employed in the setting out of works; learn the uses and applications of tools; make yourselves able to distinguish a good material from a bad material, good workmanship from bad workmanship, sound ground from treacherous ground, good puddle from bad puddle, good mortar from bad mortar, and a good workman from a bad workman. This knowledge is not to be obtained in a school, a college, or an office, and cannot be learnt from books. 6th. Make yourselves acquainted with every description of plant, and all the appliances and contrivances which an experienced contractor employs for the purpose of rendering a paper design into a substantial construction. 7th. Keep brief treatises on geology and chemistry always at hand, for some acquaintance with these sciences cognate to engineering is, in the present day, almost essential. 8th. Practise as much as possible the art of mental computation, for this will give you the means of almost intuitively arriving at determinations on questions of cost, and of at once seizing on the best of several alternative plans or methods. 9th. Be not afraid of soiling your hands or dirtying your boots, but be in every other respect—in thought, feeling, and conduct—a gentleman.

IRON PIPES FOR HOUSE-DRAINAGE.

IN the opening address, already referred to, Mr. Hawksley said,—

On the subject of the removal of the sewage of towns, no new suggestions of importance to the professional engineer have recently appeared, nor, indeed, does it seem that in this department of municipal improvement much remains to be accomplished. It is, however, worthy of remark, that in house construction it seems desirable to abandon the use of earthenware tubes with numerous and imperfect joints, and to substitute the use of iron pipes, with few and perfect joints, care being taken to provide a sufficient number of flanched or tightly-stoppered branches, to afford the means of access to the interior. By this simple arrangement, the escape of foul water and fœtid gases from the drains into the lower stories of our dwellings may be effectually prevented, and it will become a comparatively easy matter to apply, in connexion with such pipes an effective apparatus without the house for preventing the access of contaminated air from the main sewers. In many cases, the so-called "ventilation" of the sewers is much neglected, and invariably with the natural result that the pent-up sewage gases make their escape at the place of greatest pressure or least resistance, and commonly into some house towards which the sewer ascends.

THE WHITTLESEY WORKHOUSE COMPETITION.

As many as twenty-five different sets of designs were submitted for this competition, with estimates varying from 4,000*l.* to 10,700*l.* Several of these were, either from excessive cost or inelegance or inaptitude of design, deemed to be altogether unsuitable; and after examination of the remainder, four were in the first instance reserved for further consideration,—viz., those by Messrs. Nelson, of Leeds; Mr. Ladds, of Bedford-row; Mr. Oldfield, of Westminster Chambers; and Mr. Peck, of Gordon-square; estimated to cost, respectively, 5,000*l.*, 4,500*l.*, 4,550*l.*, and 4,000*l.*

Eventually the design of Mr. Peck was selected conditionally on the contract for the building being accepted by a builder (to be approved of by the guardians) at a contract price satisfactory to the Board.

ST. MARTIN'S CHURCH RESTORATION, BIRMINGHAM.

ONLY eight sets of drawings were sent in, and from these the designs by Mr. J. Chatwin (1), Mr. W. Hale (2), and Mr. Edge (3), have been selected for premiums. In Mr. Chatwin's design, which is to be carried out at a cost of 12,000*l.*, the west, together with the north and south, walls of the old church are retained; but the whole of the east end of the building is subjected to alterations, which have for their object

* Funérailles de Félix Duban." Paris: Ducher & Cie. 6, Rue Sorbonne. 1871.

the lengthening of the edifice, with the addition of providing choir, vestry, and organ-loft at the north-east angle, and a vestry; and at the corresponding south-east side, the nave, hitherto a narrow span, is considerably widened, and the aisles undergo a corresponding reduction. At the east end a lofty arch, with bracketed pillars, connects the chancel with the nave. Short transepts are planned, with the object of providing gallery seats for the school children, and affording the extra accommodation which the abandonment of the present unsightly galleries necessitates.

In Mr. Hale's design the present setting out of the nave is maintained. The roof is open timbered,—a plain and effective design. Chiefly owing to the adoption of ridge roofing for the aisles, the elevation is more striking than that of the selected design, and more desire to adhere to the original design appears to be shown than is apparent in Mr. Chatwin's drawings.

LEICESTER MUNICIPAL BUILDINGS COMPETITION.

INQUIRIES are being made why the design by Mr. Barnard, to whom the first premium was awarded, is not being carried out. Some of our Leicester friends will perhaps explain.

CAMBERWELL VESTRY HALL.

ON Wednesday in last week the selection of the plans was made. The votes were by a show of hands, and stood as follows:—

Nil Desperandum	1	—	—		
Thoro'	11	8	—		
Experience	1	—			
Civis	23	23	24*	30	31
In Foro	15	10	10	—	
Well Considered	23	25	24*	14	—
Excelsior	7	—	—	—	—
À l'œuvre, &c.	24	26	25	—	26

* Ties.

On opening the sealed letters "Civis" was found to be Mr. E. Power, of Walbrook Buildings, City; and "À l'œuvre," &c., Messrs. Berriman, of King William-street. Mr. Power will carry out his design if tenders do not exceed the estimated cost of 8,000*l.* (which is made a special resolution of the vestry), and the works will proceed at once.

THE PROPOSED SCHOOL-BUILDINGS FOR WORCESTER.

IN an article on this subject in the local *Herald*, a correspondent suggests the desirability of the Worcester School Board seeking professional advice in the selection of designs. He says:—

"Upwards of thirty sets of plans have been submitted, derived from architects in the city and from London, Birmingham, Manchester, and elsewhere; the various designs being exhibited for public inspection at the Guildhall. However able the several members of the School Board may be in their various professional pursuits, they can scarcely be expected to know individually as gentlemen, or collectively as a Board, sufficient of the arts of architecture and construction to enable them to fairly and satisfactorily adjudicate upon the labours of upwards of thirty architects and the merits or demerits of their plans and designs."

Another correspondent states that certain plans which he can name were not deposited until the second day after the latest day for deposit, namely, the 30th ult.; and yet that these plans are included with the others for consideration of the Board.

ORDNANCE MAPS.

SIR,—Would it be possible for the officials having these maps in hand to expedite the publication a little? Admittedly they are splendid works in respect of accuracy of delineation, and are invaluable as bases of other maps and plans, and for reference; but, still, the time occupied in their preparation and publication is something alarming. The other day, observing an advertisement of a "new" series of plans of London, on a 25-in. scale, being published, I sent for a sheet, and had it coloured and mounted, for my office; but what was my surprise, upon examining it carefully, to find the notification that the survey was taken 1862 to 1865, and consequently when published it was already out of date! An entire line of railway, destroying many dozens of houses, had been made in the interim, and was not shown even as projected, and various other alterations which had meanwhile occurred were equally, of course, left out.

However carefully these plans may be taken, and whatever other care may be bestowed in the plotting, engraving, &c., it never can be contended that so great a lapse of time is necessary before publication. This 25-in. scale is now going on gradually over London; but who can tell what proportion of your readers will be alive at the finish if this is the rate of progress?

HIERONYMO.

BUILDING IN SOUTH YORKSHIRE.

THE building trade in Sheffield and other South Yorkshire towns has during the past year been fairly brisk, and there is now a large amount of work on hand.

New printing-offices are in course of erection between High-street and the Hartshead, for the use of the proprietors of the *Sheffield Daily Telegraph*. They are entirely of brick, and will comprise printing-offices, reporters', &c., rooms, and all other conveniences. Mr. J. Rogers is the builder.

The erection of the new music-hall in Barker's-pool, Sheffield, is going on favourably, the slaters having just finished their work in time. The building itself externally has a somewhat heavy, overbulky appearance, but as the masonry gets in order and the scaffolding disappears, it will doubtless show to better advantage. When completed, one of the finest organs in the world will be placed in the great hall. An air-shaft is now being erected at the south-east corner in Burgess-street. Messrs. Longden & Sons are the builders; Messrs. Badger & Holmes, joiners, &c.; and Mr. Bissett for plumbing work. This edifice is expected to be ready by Christmas, 1872, and will be devoted to concerts and other entertainments of the very highest class.

Messrs. Brown, Bailey, & Dixon are erecting with the greatest possible speed new works at Attercliffe, near Sheffield, where they will carry on business as steel manufacturers, spring-makers, ironfounders, and makers of all kinds of railway materials. The works cover 13 acres of ground, and will employ about 1,500 men. There will be a frontage to Milner-road, of about 400 ft. The shops are, machine and buffer shop, hammers, smith's shop, wheel shop and forge, rolling-mill; Bessemer steel-house, to turn out 1,200 tons per week; and a rail-mill, which is to be the largest, or one of the largest, in England. Some of the shops will be ready next week, although the works were only commenced about five months ago. It is stated that Mr. George Brown (who is related to Sir John Brown) has designed the whole place himself, and has had it built under his supervision, the plastering being done by Mr. Unwin.

Mr. William Wostenholm, lately of Burgess-street, has just removed to a newly-built brick block of warehouses, workshops, &c., in Holly-street, which occupy the site whereon Messrs. Binney formerly carried on business as hammer, &c., makers. A new grinding-wheel has just been erected by Mr. Joseph Gaunt, in Cambridge-street.

New schools have been built very recently (and in some cases are yet unfinished), in Alderson-road, by Clubley & Stringfellow; in Hodgson-street, by Mr. Butler; in Pea Croft (ragged schools), by Mr. J. Butler; new schools and meeting-house for the Friends, in the Meet-house-lane; Pitsmoor schools altered by Mr. Shaw; new Wesleyan schools, Prospect-street, Walkley; Roman Catholic schools in St. Charles-street, Attercliffe, and some others. Messrs. J. H. Andrews & Co. are about completing the erection of the "Toledo Steel Works," at Neepsend, Sheffield. These works occupy over two acres, and have a frontage to the street of about 535 ft. They extend back to the river. Messrs. Sanderson, Brothers, & Co. are themselves building some extensive works at Darnall; and it is stated that they intend to concentrate their business there. Messrs. Caunell & Co., Limited, have built a new forge, to be used as an armour-plate mill; and an extensive forge is in course of erection at Messrs. Vickers, Sons, & Co.'s, Brightside. It is stated that both the last-named firms have put down the necessary apparatus to work some of their furnaces with gas, on the Siemen's patent principle. Messrs. Nixon & Winterbottom, Broomhall-street, have just rebuilt part of their works; Messrs. John Brown & Co. are putting down additional furnaces; Messrs. Newbold & Co., Newhall, have erected new works for saw-making; and Messrs. Firth & Sons, with many other Sheffield firms, have just completed alterations suitable for their increasing businesses. New schools and church are being erected at Spring Hill, Sheffield, for the Roman Catholics; and the Midland Railway Company are erecting extensive new stabling in Saville-street, Mr. Saul being the builder. A very considerable number of other undertakings of importance are also on hand, in various parts of South Yorkshire; and the amount of private buildings is and has been very large indeed. A number of villas has been erected in Westbourne-road, Newbould-lane, Shortridge-road, &c., Sheffield, and a great number of smaller houses at Heeley, Walkley, and Attercliffe. It is stated that the slaters and other branches intend to go in for the nine-hours very shortly.

The price of mortar has been raised by some firms 6d., in consequence of the advance in the cost of coals.

THE NEW (R.C.) CHURCH OF OUR LADY AND ST. PHILIP, ARUNDEL.

NOTICES of the progress of this church have from time to time appeared in this journal and in other papers, and occasionally it has been designated a cathedral, which it may be as well in this place to correct. It has not, and aims not at, more than the character of a parish church, of which there are so many and such splendid examples in the ancient fabrics of that class spread over the kingdom; and this church being founded and erected at the instance of the Duke of Norfolk, in the ancient ducal borough of the family he represents, being within a stone's throw of the famous Fitzalan Chantry and the old Church of St. Nicholas (the works of his ancestors), and grouping in the view of Arundel with the Castle, it would seem only natural, in the fitness of things, that a certain dignity and importance should be expressed in a structure that may be said to have a representative character like this.

The Duke, having chosen for his architects Messrs. Joseph A. Hansom & Son, and for builders the Messrs. Myers, the first work of throwing in concrete for the foundations was begun on the 27th of December, 1869; and although a very serious interruption took place in having to carry the foundations down to the solid chalk rock, which in some instances was as much as 50 ft. below the surface of the ground; yet, while we write, the building is well-nigh ready for the nave roof-plates, some 70 ft. above ground; most of the exterior and some of the interior carving being done; the walls being 3 ft. and 3 ft. 6 in. thick (those of the tower much thicker), and faced with ashlar stone inside and out. The progress has been steady and regular, an evidence of the excellent arrangements and management of the builders.

The view of the church which we insert this week will give a good general idea of the arrangement. It is cruciform in plan, having nave and aisles to the west of the transept, and choir and chapels to the east. At the north-west angle the tower stands in the place of porch, and at the south-west angle is an octagonal baptistery projecting from the line of the south wall. Besides the entrance under the tower there is a great western portal, and in each transept a smaller door of admission to the church. At the south-east angle will be the sacristies, lying between and communicating with both the church and the presbytery. Within the church, at the west end is the large organ-loft, raised high on stone groined vaulting, and with carved stone parapet front. The whole of the church, the choir, the three chapels, the baptistery, and tower-porch, are to be groin-vaulted in stone ribs and bands and chalk filling.

The dimensions of the church are as follow:—External length from east to west, 200 ft.; interior, across the transept, 94 ft.; width of nave and choir, 33 ft.; width of nave aisles, 12 ft.; width of transepts, 27 ft.; length of choir, 52 ft.; length of the chapel immediately on each side of the choir, and open to it by archways, 34 ft.; height to ridge of nave groining, 72 ft. The groining of the nave, choir, and transept arches springs from a level of 50 ft. from the floor. The flèche, or sanctus bell-turret, rises to the height of 140 ft. The spire is intended to be 270 ft. to the apex. The north transept window (seen in the view) is 37 ft. by 18 ft., sight measure. The diameter of the rose window at the west end, 23 ft. 6 in. The church is intended to be opened during the present year.

WATER SUPPLY IN MARGATE.

ONLY a few years ago the entire water-supply of the inhabitants of Margate was derived from wells, sunk but a few dozen feet down into the chalk, which is here from 900 ft. to 1,000 ft. thick; and these wells—public and private—were often within a very few feet of some neighbouring cesspool. Percolation, no doubt, went on continuously, day and night, from these cesspools into the wells, for no one in Margate then or now ever thinks of lining a cesspool with bricks, or of making it water-tight; and if this did not affect the death-rate, it must be supposed that filtration through the greater or less density of the chalk tended to disarm the exudations of the cesspools to a great extent of their noxious qualities.

But the rapid growth of the town, and the perception by some of the inhabitants that, sooner or later, this comfortable and independent arrangement, of every man having his own cesspool and his own well, must inevitably break down, led to the proposition being made to the local Board of Health (Margate is a *corporation* now) that they should construct waterworks in the neighbourhood for the supply of the town; but the local Board rejected the proposition, and refused to expend the public rates upon any such visionary scheme. The matter was then taken up by a few private individuals, and they proceeded to form a Margate Waterworks Company (Limited); but the local Board would not hear of it, and point blank refused to grant permission to the new-born company to lay down their water-pipes in the streets. Thereupon the promoters of the scheme, nothing daunted, went to Parliament for powers to enable them to do what the local Board had forbidden; and to Parliament the local Board followed them; but there was some little hitch in the opposition offered by the local Board, who at first did nothing, until the time for lodging appeals had nearly gone by, and then made such scrambling haste that the resolution directing their legal representative to appeal was found to have been passed at a meeting of which the statutory notice had not been given quite soon enough to render it legal, and thus the opposition of the local Board fell through.

And so the Margate Waterworks Company got their Act, and Messrs. Docwra & Son, of Ball's Pond-road, undertook the contract for the works.

There was no difficulty in getting water at the spot chosen, close by the famed Tivoli Gardens;—a main shaft of 13 ft. in diameter and 50 ft. deep, with headings of an aggregate length of 400 ft., giving a yield of 200,000 gallons per diem,—equal to about 20 gallons per head of the population. The supply is continuous day and night throughout the town, and the analysis of the water is,—

Solid Matter per gallon.	Loss by Ignition.	Hardness before Boiling.	Hardness after Boiling.
45·92	3·30	18·31	10·35

The shares of the company are 10*l.* each, and its capital 16,000*l.* Very great difficulty was at first experienced in placing the shares, and many were offered at 8*l.* and 9*l.* each, that would now be esteemed cheap at 20*l.* The annual dividend is limited to 10 per cent., and the directors are making a move to increase their capital, and enlarge and extend their works.

Meantime, most of the public wells have been found to be more or less—and *more* rather than *less*—affected by infiltration of sewage matter, their brightness and clearness and softness have all been shown by analysis to cover very unmistakable dangerous qualities, and (not without some little opposition, however, on the part of the inhabitants, with many of whom these deleterious waters were in particular favour for the making of tea) the authorities have very properly had them closed.

And now the scene changes. The Town Council (the Local Board of the day) see that their opposition policy of a few years (about ten) ago was wholly wrong,—that the water supply of the town ought all along to have been in their hands, instead of in that of a private company; and now in the days of the success of that company, the Town Council have been making overtures to them to permit a purchase of their property for the benefit of the inhabitants; and so earnest are they in this matter, that they have within the last few weeks passed a resolution affirming the proposition that it is desirable for the town to possess the waterworks, and *actually offering the company* 32,000*l.*—just double their capital—for their interest therein.

The moral to be drawn from this plain statement of the facts is calculated to be of service to oppositionists upon local boards even of the present day. Whether the Margate Waterworks Company will sell out for double their invested capital remains to be seen. Rumour says that they will not.

APPOINTMENT OF ENGINEER FOR THE BRUTON DRAINAGE.

A CORRESPONDENT complains that having made an application for this appointment, and taken some trouble in the matter, he received intimation from Mr. Henry Dyne, by an open postcard, that his application "was not entertained." The complaint is a perfectly just one. Properly qualified candidates for such a post are certainly entitled to courtesy.

MEMORIAL CHAPEL TO THE LATE EARL OF DERBY.

A CHANTRY or memorial chapel, containing a statue of the late Earl of Derby, has been added to Knowsley Church. The new chapel has been inaugurated. It forms an addition to the north-east portion of the church, and has been erected at the expense of a number of friends of the late earl resident in the immediate neighbourhood. The design was furnished by Mr. Paley, of Lancaster. The chapel is built of red sandstone, and opens into the chancel by means of three arches, and into the transept by two arches. The groined roof is of pitch pine. The columns supporting the arches are of limestone, and the floor is partly of limestone and partly inlaid with tiles. The building will shortly be further enriched by several stained-glass windows. Around a portion of two sides of the chapel there are a number of carved seats of Dantzic oak, which are intended for the accommodation of the members of the Derby family who attend service at the church. In the middle of the chapel stands the monument erected by the tenantry. It is in the form of a recumbent statue of the late earl, by Noble, in white marble, and resting on a carved tomb of white stone. The statue is said to be an excellent likeness. It represents the late earl attired in his robes of Chancellor of the University of Oxford, reposing as in the sleep of death. The four sides of the tomb will be enriched with the arms of the Derby family. The total cost of the memorial chapel is about 3,000*l.*, of which nearly 1,000*l.* have been expended on the statue and tomb. The work has been carried out by Messrs. Burroughs & Son, builders, Liverpool.

THE LIVERPOOL FREE PUBLIC LIBRARY AND MUSEUM.

THE local Library and Museum Committee have just issued their report for the year ending on the 31st of August last. During the past year (they say) the Institution has pursued its course of usefulness to the utmost extent which the resources and space at the disposal of the committee have enabled them to go. The success of the autumn exhibition of pictures has been beyond their most sanguine expectation. The exhibition opened on Saturday, September 2nd, and closed on Saturday, November 18th. It was attended by 22,725 persons, besides holders of season tickets, numbering 313. The number of pictures exhibited was 887, of which were sold 235, at prices amounting in the whole to 6,395*l.* 2s. 6d. The committee have purchased, on behalf of the Institution, for the permanent gallery, pictures to the value of 500*l.*, and are prepared to devote a larger sum for the same purpose next year.

The number of volumes issued from the reference library during the year has been 507,335, against 620,124 in the previous year. This diminution is partly accounted for by the closing of the library for several weeks.

During the year 2,038 volumes of books have been added to the library.

In reference to the museum, the following statistics are given:—Day visitors: 1869-70 (52 weeks), 446,473; 1870-71 (49 weeks), 362,657; decrease in 1870-71, 83,816. Evening visitors: 1869-70 (26 nights), 54,473; 1870-71 (25 nights), 42,730; decrease in 1870-71, 11,743. Total day and evening visitors in 1869-70, 500,946; 1870-71, 405,387; decrease in 1870-71, 95,559. Average of seven preceding years, 473,435; total of 1870-71, as above, 405,387; decrease, 68,048. The attraction of the museum not only brings visitors from the town itself, but the numbers have been largely swelled by excursion parties from the manufacturing districts. These fluctuate from time to time, according to the season, the weather, the wide extent of choice offered by the ever-increasing railway system. A cold, wet summer deters multitudes, whom a fine warm season would bring over.

A NEW SYNAGOGUE FOR SHEFFIELD.

THE corner-stone of a synagogue which is being erected by the Jewish community in Sheffield, has been laid by the Rev. A. L. Green, minister of the Central Synagogue, London. The present synagogue in Fig-tree-lane has for some time past proved inadequate to the requirements of a congregation much larger than was the case a few years ago: and, besides this, the lack of school accommodation has been very much felt. The new building is in North Church-street. The basement will consist of a school-room accommodating 60 children, with other rooms, approached on the level from North Church-street, and having a second entrance by a flight of stairs from St. Peter's-close. On the ground-floor is to be the synagogue, 38 ft. long by 30 ft. wide, fitted with pews along each side, and having the reading-desk or almemor in the centre. At the east end, in a semicircular recess, is to be placed the Aaron Hakodesh or Ark, containing the sacred rolls, on which are inscribed the Books of Moses. Over this will be a small stained-glass window, having the Ten Commandments worked thereon. A staircase in the lobby will lead to the ladies' gallery, which extends over the lobby. A teachers' residence and board-room are to be attached. The whole is to be built of brick, and in Early Gothic style. The roof will be open-timbered, and the seats and gallery front will be of pitch pine. The synagogue will accommodate about 230 persons. The builder is Mr. Wade; the joiner, Mr. Flowerday; and the works are to be carried out under the superintendence of Mr. Mitchell-Withers, the architect.

The total cost is estimated at about 1,800*l.*

NORTHERN ARCHITECTURAL STUDENTS' SOCIETY.

A MEETING of this Society was held on Tuesday evening last, Mr. W. L. Newcombe (president) in the chair. Some months ago Mr. Ralph Thompson, of Newcastle, offered to present to the Society a gold medal, to be given to the author of the best sketch or drawing from an existing building. The competition took place a short time ago, and the drawings submitted were sent up to Mr. W. Burges, of London, who kindly undertook the office of adjudicator. His award gave the medal to Mr. Joseph Oswald, of Newcastle, for a measured drawing of the choir of Lanercost Priory, Cumberland; and a present of books, as second prize, to Mr. W. H. S. Thompson, of Newcastle, for a sketch of the Dacre Tower, Lanercost. The president, in an appropriate speech, presented the medal to Mr. Joseph Oswald, who briefly replied. The medal is in the form of a star or Maltese cross, and has on one side the armorial bearings of Newcastle, and on the other a suitable inscription. After the presentation a paper was read by Mr. G. H. Morton, architect, and led to a short discussion.

THE NEW VICTORIA HALL IN SUNDERLAND.

THE newly-erected "Victoria Hall and Temperance Institute," Toward-road, near the Extension Park, Sunderland, has been opened with *éclat*. The new hall has been erected to supply the need, long felt in Sunderland, of a large public room capable of holding 3,000 persons; and as it is constructed in the theatre fashion, it is adapted for large public meetings, concerts, and musical and dramatic entertainments. The building fund has been supplied by a company of 1*l.* shareholders, on the limited liability principle, the Sunderland Temperance Society holding shares to the amount of 2,000*l.*, or one-fourth of the total cost of that portion of the building now completed,—the large hall, lobbies, and retiring-rooms. The cost of the completed portion was 8,000*l.* The principal

entrance is from Toward-road, whence a flight of steps leads to the floor of the hall, through a corridor. From the entrance level, a staircase leads to the dress circle, with its spacious lobby and retiring-rooms. The circle is fitted with numbered arm-chair seats, covered with red velvet plush, and a partition of glass separates the circle from the lobby. The platform is somewhat on the fashion of that in the New Town-hall of Newcastle. The original design of Mr. Hoskins could not be carried out for want of funds.

The whole of the various works have been carried out under the supervision of Mr. Charles Cobham, as clerk of the works. The contractors were,—for masons' work, Messrs. Hopper & Oliver; bricklayers', Messrs. Sydney & Parkin; carpenters' and joiners', Messrs. David & John Rankin; plumbers', Mr. Henry Tonkinson; plasterers', Messrs. J. Montgomery & Son; slaters', Mr. Robert Preston; painters' and glaziers', Mr. G. N. Arnison; gasfitters', Mr. J. J. Kirtley; upholsterers', Messrs. Hobkirk, Smith, & Whitecross.

MID-LONDON RAILWAY.

THE ESTIMATES.

IT may safely be assumed that, as so much expense has been already incurred in the survey of the line, in the scheduling of an immense amount of property, and in other outgoings, the promoters are quite prepared to find the necessary deposit, and to proceed, if opponents, legal forms, and the Legislature will permit them, to the execution of this important project.

In accordance with the Standing Orders of Parliament, the estimates of costs for the construction of the line were duly deposited on the 30th ult. for the 31st.

The Mid-London Line, it may be proper to recall, is to be promoted by two Bills, the more important being the eastern section. The names of five gentlemen of property appear on the Bill as constituting the nucleus of the company. Railway No. 1 is laid out as rather more than 1¼ mile in length, to commence on the south side of Oxford-street, about eight chains to the east of the Marble Arch, and terminating in the parish of St. Anne, Soho, in George-yard, occupied by Messrs. Crosse & Blackwell. The estimated cost of this portion is for 163,000 cubic yards of excavation, at 6s., 48,900*l.*; covered way, including road, bridges, and retaining walls, 59,000*l.*; accommodation bridges and works,—included in covered way,—culverts, and drains, 20,000*l.*; metallings of roads, 1,500*l.*; permanent way fencing, included in covered way, at 6,000*l.* per mile, 6,910*l.*; permanent way for sidings and cost of junctions, 1,000*l.*; contingencies, 15 per cent., 29,596*l.*; land and buildings, 6a. 1r. 16p., 390,000*l.*: total, 616,906*l.* Railway No. 2, of 1 mile 3 furlongs and 40 yards in length, extends from a junction with the eastern end of No. 1 to a junction in the parish of St. Sepulchre, with the London, Chatham, and Dover Railway. The estimated cost for this section is for works, 191,692*l.*; contingencies, at 15 per cent., 28,754*l.*; land and buildings, 7a. 1r. 10p., 480,000*l.*; total, 700,446*l.* Railway No. 3, of 6 furlongs 1 chain 18 yards, commences by a junction with No. 2, and terminates in Coleman-street, to the west of Moorgate-street. The cost of this line is estimated at 133,036*l.* for works; 19,956*l.* for contingencies; and 250,000*l.* for land and buildings, the land embracing 4a. 1r. 20p.; total estimate, 402,992*l.* Railway No. 4 commences by a junction at the end of No. 3, and terminates by a junction with the authorised Railway No. 1 of the East London Railway Company, in the parish of St. George in the East. The estimated cost for this section is, for works, 230,631*l.*; contingencies at 20 per cent., being 5 per cent. extra, 46,126*l.*; land and buildings, 7a. 2r., 410,000*l.*; total, 686,757*l.* Section No. 5 is a junction, 1 furlong 6 chains 10 yards, from Line No. 1 in the parish of St. Anne, Soho, to a junction with the authorised London Central Railway. The estimated cost of this section is 103,801*l.*, including 50,000*l.* for land and buildings. The sixth section is a junction of 1 furlong 8 chains 6 yards, in the hamlet of Mile-end Old Town, between No. 4 and the authorised East London Railway; estimated cost, 85,714*l.*

An important feature in this project is the formation of a new street in two sections; the first commencing at the angle formed by Giltspur-street and Newgate-street, and terminating in the parish of St. Stephen, Coleman-street, in the city of London. The second section is from the point just indicated to the junction of Commercial-street, Commercial-road, and Whitechapel High-street. The estimated cost of the works, contingencies, land and buildings of the streets, is, for No. 1, 443,000*l.*, and for No. 2, 957,000*l.* Part of the cost of the land and buildings for the new streets is included in the railway estimates already quoted.

The Bill and estimates for the western section of the Mid-London are again subdivided into two parts. Railway No. 1 is 2 miles 7 furlongs and 5 chains in length, commencing by a junction with the London and North-Western line at Willesden, and terminating in the parish of St. George, Hanover-square, on the east side of Park-street, near the west end of Oxford-street. In this section there are 37 road-bridges, and a railway-bridge, which, with retaining walls, are extimated to cost 102,000*l.*; the stations are estimated at 94,000*l.*; the total cost of works, 350,000*l.*; contingencies, at 15 per cent., 52,635*l.*; land (22 acres), and buildings, 338,000*l.*; total estimate, 741,535*l.* The second section, of 5 furlongs 5 chains, is from a junction between No. 1 and the London and North-Western Railway. This portion is estimated to cost 28,343*l.*, including 5 acres of land.

The grand totals embraced by the two Bills and the two sets of estimates are thus: in the eastern section, lengths, 5 miles, 4 furlongs, and 22 yards; for railways, 2,596,616*l.*; for two streets, 1,400,000*l.* Western section, 3 miles 4 furlongs 7 chains, estimated cost, 769,878*l.*, say 770,000*l.*; length of lines in all, 9 miles 7 chains 20 yards, estimated cost, 4,766,616*l.* This amount may possibly be considerably reduced by the Corporation of London, or the Metropolitan Board of Works bearing a portion of the expense of the new street from Holborn Viaduct to Whitechapel.

It is proposed to take powers in the Bills to underpin or otherwise strengthen all houses or other buildings within 100 ft. of the railway, after ten days' notice given to the owners, lessees, or occupiers of the houses or buildings to be underpinned, or otherwise strengthened, the company to be liable for inconvenience, loss, or damage, resulting from the exercise of its powers. If the owner, lessee, or occupier, gives a counter notice, disputing the necessity of underpinning, the question of necessity to be left to a civil engineer to be appointed at the instance of either party by the Board of Trade, the reference to be paid by the Company, and the other costs of the reference to be in his discretion.

LONDON ROOKERIES.

EFFORTS should be made to entirely sweep away the "rookeries" of London; *i.e.*, those large collections of narrow, close, unhealthy courts and alleys which we find grouped together in masses, at certain parts of town. A single court is no object, but in some districts we observe a perfect wilderness of them grouped in an unwholesome mass. Now, when there are Alsatias of this description, the indigent will always seek them, or be driven into them, and all our efforts to improve their physical or moral condition, will be frustrated from the nature of their homes. Let these dens then be rooted out entirely, and let new dwellings on new streets be erected in their place. We do not content ourselves with building model lodging-houses in good positions: we propose to destroy whole territories of slums, and lay out new streets on the sites. At first sight, even 500,000*l.* may seem insufficient to grapple with such a colossal undertaking; but well applied, it would effect much.

It has proved more than once in the recent history of London that, upon buying up a quantity of crowded low-class dwellings, and making a good wide road through the mass, the ground thus opened out on an improved scale has gone far towards repaying the cost. A most important consideration and valuable for this purpose! Now in London there are several masses of courts on which this principle could be tried. An Act of Parliament would be necessary, which is said to cost about 1,000*l.* Take, for instance, the block of courts right and left of Bedfordbury, between St. Martin's-lane and Bedford-street; the blocks of courts about Drury-lane, about Clare Market, &c.; another block of courts south of Cursitor-street, Chancery-lane; the rookeries around Baldwin's Gardens, about Laystall-street; the fifty acres of courts and alleys all in a mass between Aldersgate-street and Bunhill Fields, opening out of Upper Whitecross-street, Golden-lane, &c.; several acres of unwholesome courts in a block at the back of the Mint; and another block at Wapping between the London Docks and the river. These constitute the chief mass rookeries of London, and several have been remarked upon from time to time by the *Builder*. Our proposal is to buy them up, or the worst of them; then to level every building to the ground, lay out the land with good 40 ft. roads, and either build improved and larger dwellings there, or let the ground to builders. The ground or new buildings, as the case might be, could then be sold, and the net proceeds embarked in a fresh undertaking. It is doing only half the work to erect model lodging-houses here and there if the great bulk of the poor are still left festering in public stews. Let us sweep away these stews altogether.

Half a million of money would not indeed buy up all the courts of London; but it would do a very great deal by being invested and reinvested in the way just mentioned; more than might be thought. We submit that it will be difficult in the extreme to do the greatest good to the greatest number of people in any other manner. This would be a permanent and not a temporary benefit; it would affect the very poor most, and would indirectly benefit the whole capital. Building model villages, on the contrary, however desirable, would leave the poorest still untouched in their dens; and it must be remembered the bulk of London working-men, however willing to live out of town, find it inconvenient or impossible in practice so to do.

H. & R. P.

EXPERIMENTS IN PAVING.

THE St. George's, Hanover-square, Works Committee have considered the question of the paving works necessary during the ensuing year. A report was read from a Committee of View recommending that in answer to a memorial from the inhabitants of Old and New Bond streets asking for asphalte in the carriageway on the east side of Old Bond-street, a pavement of asphalte be laid down from Piccadilly to Burlington-gardens, and the inhabitants called upon to set their coal-plates in an iron rim. The Committee of View also recommended that Piccadilly between Bolton and Stratton streets be paved with Victoria stone. The surveyor, in answer to some questions, said the Victoria stone appeared to be a mixture of broken granite and Portland cement. After it was prepared it was placed in a bath of silicate, where it remained for a fortnight, becoming impregnated with silica and extremely hard. He had seen the Victoria stone laid down in front of St. Mildred's, Poultry, the only piece laid down in London, and considered it extremely durable, harder than York paving. The Committee decided to recommend the Vestry to adopt the report.

SEWAGE AND WATER SUPPLY.

HAVING suffered severely when young with fever, and since lost several friends, some of them men in the prime of life, who have left widows and large families to mourn their loss, and knowing others that are now sick with typhoid fever, I venture to pen these few lines.

During forty-five years, constantly having something to do in well-sinking, drainage, sewering, waterworks, &c., my experience has shown me that as gunpowder is dangerous when put in contact with fire, so is nightsoil when in contact with water, where old wells, drains, cesspools, and inferior traps, and badly-fitted water-closets, are allowed to remain in use.

I enclose you section, showing the drainage and water supply of a house on a small piece of land I purchased in Chippenham, Wilts, twenty years ago, and on investigation at the time I found a large number of other cottages in the same condition.*

Knowing the danger, and having a large body of workmen, also my own family, located there, I endeavoured, with other persons, to obtain a public water supply generally for the town; but, not succeeding, I sank a private well for the use of ourselves and workmen, procuring most excellent water from the deeper springs, and from this well most of the inhabitants of the town are now supplied.

* The section shows a well for the water supply, lined with rough pieces of stone, between the cesspits of two privies, the contents of which percolate to the water.

As to rivers, I well remember seeing fine salmon taken from the Thames between Isleworth Ferry and Richmond Bridge, and often watched the gradual pollution of its waters since with regret. The time will come, if not at hand, when it will be necessary for the Legislature to take further steps in the matter, both as regards the water supply and the disposal of the sewage from the dwellings.

Providence provides a sufficiency of good water in England for every creature thereof to drink; and it will be expedient in some districts where the strata are favourable to sink new wells to the deeper springs, stopping out all surface matter and water. In other localities it will be necessary to revise some of those old water-course and mill-dam rights, and also to substitute the steam-engine for the old water-wheel, so that the locked-up springs and pure water streams may be made more freely to flow for the use of the people?

With reference to the disposal of sewage, I think it would not only be a waste and loss to the country, but a sin to send it from our inland cities and towns to sea, for which it was not intended. As the grave is the great deodoriser of the dead, so is the earth to the excrement of the living.

The farm, England, is wisely arranged, with its parcels of fertile land, and also its portions of inferior soils, chalk downs, and sandy commons, left for the use of and improvement by man. And it contains also an abundance of the richest and most durable manure, if carefully husbanded, which ought to be conveyed to those soils placed by nature to receive it. And seeing what fine fruit, ears of corn, vegetables, and roots, were produced in the valley of the Thames, and by my father and others after the enclosure of Hounslow Heath, by the use of night-soil, urine, and contents of cesspools, I am convinced that in a reasonable time some of those unprofitable lands may be turned into fruitful gardens and paying fields in producing for the increasing population.

And if the Government and heads of families will still persevere in procuring for them good drainage, fresh air, wholesome food, and pure water, I think there need not be much alarm as to degeneration.

ROWLAND BROTHERHOOD.

THE NEW COURTS OF JUSTICE.

WE have received a long letter from Mr. Edmund Sharpe, expressing his approval of special parts of Mr. Street's design; but as it had already appeared in the *Times*, we cannot devote to it the space it would occupy.

SIR,—I have hitherto carefully abstained from all criticism on Mr. Street's designs, and have no intention of deviating from this course.

I regret, therefore, extremely, that the references to me in his recent pamphlet (many of which appear to me uncalled for, and very misleading) oblige me to take steps to make public the real state of the case as regards my position in the late competition.

I hope my answer will be in the hands of the printer this week, and in the meantime must ask your readers to hesitate before accepting the statements referred to.

EDWARD M. BARRY.

DESTRUCTION OF CRUMPSALL CHURCH BY LIGHTNING.

DURING a recent thunderstorm of great violence, St. Mary's Church, Higher Crumpsall, Manchester, was struck and set fire to. There was a want both of water and of fire-engines; and the interior was completely gutted. The edifice was built in 1859, from the designs of Messrs. Mangnall & Littlewood, of Manchester, architects. It was 87 ft. long and 57 ft. wide (inside measurement), and contained sittings for 770 persons. It was in the Decorated Gothic style. The tower and spire were added about six years ago, at a cost of 1,500*l*., making the total cost of the building upwards of 6,500*l*. In the base of the tower was placed an organ, which, with the font and everything else in the building that could be burned, has been totally consumed. At the east end of the edifice there was a stained-glass window, which cost over 300*l*., and another at the south side. Both of these have been completely demolished. One of Milner's safes, although it was exposed to the fury of the flames for some time, has preserved its documentary contents complete. The stone pillars of the church present the appearance of having been chopped with a ponderous axe.

The fire was first observed in the vestry, which is situated at the north-east corner of the building, and by some persons it is believed that the lightning struck this part of the church first. Others are of opinion that the spire was first struck, and that thence the lightning flashed down the conductor into the interior of the church, along a gas-pipe under the flooring, to the vestry, and afterwards to the rectory by an underground gas-pipe. Here it stopped by causing a slight breakage in the ceiling of the cellar, and without any other damage further than that of melting a small leaden pipe which supplies one of the upper rooms with gas.

The total amount of damage done is estimated at fully 3,000*l*., which, it is stated, will be nearly covered by the insurance.

LIBERALITY IN WILTSHIRE.

SIR,—In the agricultural village of All Cannings, in Wiltshire, a reading-room has been established by the more influential inhabitants for the benefit of working men, and which it is proposed to make self-supporting, if possible, by means of members' contributions. In the same village some new buildings are in progress, and the workmen employed thereon are necessarily strangers in the neighbourhood; but they have been in the same employ nearly three years, and bear characters above the average, yet are denied the privilege of membership, and consequently the use of the room.

You as well as the *Times* have urged the necessity of providing places of evening resort for working men who had done their daily labour; and I write this to show, first, the opinion entertained of building operatives in out-of-the-way country districts; and, secondly, the fact that with all the talk about the difficulty of weaning men from the public-house or beer-shop, and getting them to spend their leisure time in a better way, they have in many instances only "Hobson's choice." T. P.

ST. PETER'S SCHOOLS, LONDON DOCKS.

THE schools lately erected in this poor and thickly-populated parish were recently opened by the Lord Bishop of London. The school buildings are three stories high, and afford accommodation for 600 children, namely, 200 on each floor. The ground story is for the infants, the first floor for the girls, and the top floor for the boys. The schoolrooms are 74 ft. long, 18 ft. wide, and 14 ft. high, and a class-room is attached to each, 19 ft. 6 in. by 18 ft. There are two entrances, one for the boys, and the other for the girls and infants. Two separate staircases have also been provided. Water is laid on throughout the buildings, and a lift for the supply of coals to the girls' and boys' schools has also been included in the general arrangements. Yards have been provided for both boys and girls, and are complete with the necessary offices. The buildings have been designed in as economical a style as possible. The exterior walls are faced with best stock bricks, relieved by bands of red and black bricks. All the windows have arches over them in red and malm bricks, with the exception of those to the boys' school, which have chamfered stone heads. A projecting parapet runs along the entire length of the building, and from the centre of the façade rises a gabled bell-cot, surmounted by a wrought-iron cross supplied by Messrs. Richardson, Slade, & Co. In a niche under the bell is a very beautiful carved stone figure of the Good Shepherd, from the studio of Mr. Farmer. The interior of the building has also been kept as plain as possible, the walls are all plastered, but the otherwise monotonous appearance is relieved by all the doors and windows having red and white brick arches over them, and all the windows have chamfered red brick sills. The wood girders carrying the floors are exposed to view, and are stained and varnished. The removable partitions between the school and class-rooms are treated in the same manner.

The corner-stone bears the following inscription:—"To the Glory of God, and the advancement of His Holy Catholic Church, in the religious education of His children, this stone was laid on the Festival of St. Peter, A.D. 1871, by the Earl of Powis, LL.D., High Steward of the University of Cambridge. C. F. Lowder, M.A., vicar. W. H. Martin, F. W. Paice, churchwardens of St. Peter's."

The contractor for the works was Mr. Ennor, and Mr. Whall acted as the foreman. The forms, desks, and class-room galleries have been supplied by Mr. Geo. Hammer, of St. Martin's-lane. The fittings for yard offices are from Messrs. Macfarlane's establishment. The gasfittings are being made by Messrs. Hart & Son; and a Gurney stove for each of the large schoolrooms has been supplied by Mr. Edwards, of Great Marlborough-street. Mr. J. R. Veall, of Wolverhampton, supplied the bills of quantities. The contract drawings were prepared by the vicar's brother, the Rev. W. H. Lowder, a former pupil of Mr. Butterfield, and now vicar of Alvanley, Cheshire. The buildings have been erected under the personal superintendence of Mr. Bowes A. Paice, of London, architect, who also supplied most of the working drawings.

MEETING OF BUILDERS IN LONDON.

WE understand that a large meeting of employers of labour was held at the Palace Hotel, Westminster, on Thursday, the 11th inst. It comprised deputations from every seat of industry throughout England and Scotland. The demands of the operatives having gone on from ten hours to nine, and from that to eight and a half, with an intimation from Mr. Scott Russell that that was only a step to forty-eight hours per week, in competition with sixty-five on the Continent, masters find it indispensable, it was said, to form a defensive coalition, and the meeting turned itself on the spot into an association of employers to arrange or resist the demands of trade-unions and other combinations of workmen. A statement was given in by each firm of the number of hands in their employment, and the aggregate proved to exceed 100,000 men.

CEMENTING WATER-TANKS.

SIR,—In answer to "Stagnum," in your issue of the 13th, twenty years' experience has taught me the following:—Two of sharp washed sand and one of cement will stick to brickwork best. To make it impervious, float it, and finish it in one coat, by watching it and working it with the hand-float as it is setting; then take some dry cement in your hand, and dust it over, to draw out the water; work it again with the float, and repeat this till it is too hard for the float, and then give it a thorough rubbing and pressing with the flat part of the plastering-trowel. By this plan I have completed a well 60 ft. deep, with the water streaming down the brickwork, and kept it all back by beginning at the top and working down. A. W.

SOME of the remarks on this subject in your last number (p. 33) are good and correct. The addition of a proper proportion of good gritty sand makes the cement better, say, in the ratio of 1 to 2. The Hafod-y-Weirglodd Company, Wrexham, have a good article for the purpose, being a pure silica in its component parts. FLUENS.

WEST LONDON SCHOOL OF ART.

ON Wednesday evening last Mr. Beresford Hope, M.P., presided over the annual meeting for the distribution of prizes to the successful candidates among the pupils of this institution, at 204, Great Portland-street. The gallery was decorated with a good collection of the productions of the scholars, including oil-painting and water-colour, chalk, and pencil drawings, besides many architectural designs. On the platform were Mr. Geo. A. Stewart, the head master of the school; Mr. Peter Graham, the treasurer; Mr. S. M. Hubert, the hon. secretary; and Mr. J. H. Donaldson. At the request of the chairman, the head master read the annual report, which was of an unusually satisfactory character, and showed a steady increase in the number of the students as compared with that of former years. Mr. Beresford Hope, who has somewhat "dropped" architecture lately, made an interesting address, and insisted upon the necessity of the mind being trained to a wise perception of harmony and beauty. Without this perception, he said, a state of things bordering on the ridiculous would be produced. Art designing had the salutary effect of imparting ideas of proportion, of size, and, he might add, of common sense. If, unlike those who lived in the country, Londoners could not enjoy the sight of the majestic waves, or the variegated landscape, they might

find compensation in endeavouring, by the aid of schools like this, to elevate and refine their minds. He wished to impress upon his hearers that the prizes were but a means to an end. Having regard to the number, he was able to say that out of 116 schools of art in England this was one of the best. In conclusion, Mr. Hope complimented Mr. Stewart on the ability he had displayed in conducting the school. The successful candidates were then called forward, and received the prizes. Mr. Grayson, Mr. Webber, and Miss Keeton, gained the most. The Treasurer, in proposing a vote of thanks to the Chairman, could not help noticing that manufacturers, who had so great an interest in the success of schools of art, did not pay them so much attention as might be wished.

COVERED CAB-STANDS.

AT the ordinary meeting of the Westminster District Board of Works, a letter was read from Colonel Henderson, the Chief Commissioner of Police, inclosing a sketch of a covering, which, with the concurrence of the Board and the Secretary of State for the Home Department, he proposes to erect over the cab-stand at Knightsbridge, near Sloane-street. Colonel Henderson, in his letter, set out that the Board would not be called upon to defray the expenses of lighting; that there would be a place at the east end of the stand for the sale of coffee and newspapers, and a refuge for persons waiting for the omnibus; while at the other end there would be a refuge for the cabmen. The cost of the stand, roofed in with glass in a horticultural fashion, Colonel Henderson estimates at about 700*l.*; and it was proposed, should the experiment prove successful to erect covered stands in other parts of the metropolis. Mr. Ridley hoped the Board would not surrender any of the public highway. The surveyor, in answer to a question, said he approved of the idea of the covered cab-stand. The Board decided to give the required permission so far as they legally can or may; with the proviso that the police authorities take all the responsibility, and remove the cab-stand covering at any time the Board call upon them to do so. Some years have passed since we first urged that protection should be given to cabs and their drivers.

CUTTING OAK TIMBER.

SIR,—In reply to the letter in the *Builder* of the 13th inst., I can give you some advice on the subject of "oak panelling."

I should select oak-trees known to be old and hearty, with clean, straight butts, from 15 in. to 20 in. in diameter; I should then have the bark taken off as they stand, and leave them thus till the winter,—the sap will then partially dry out, and make the wood a rich brown colour. As soon as they are cut down, have them sawn up at once into the lengths you require the panelling, 6 in. or 8 in. wide and 1 in. to 1½ in. thick. Be careful to cut out all the heart shakes, by having one cut through the centre of the log before edging the boards to the required width.

With regard to the drying process, stack the boards in a shed with a good draught through it, and load them down, with slips between each board, to prevent warping. If this be done they will be found to dry well and speedily, and they will not require to be exposed to the weather.

GEORGE MARSHALL, *Timber Merchant.*

SIR,—In reply to your correspondent, it is rather difficult to explain without diagrams; but I will try to do so. Cut the largest trees, bark them standing, in the spring, and fell them in the following winter, "if you wish to save the bark," but remember you lose nine months' seasoning of the wood (and there is, perhaps, too much made of this falling in the winter theory: it is seldom put in practice); cut off the longest length you require from the butt of the tree, and sell the top of the tree for a rougher purpose.

If the tree is large enough for the purpose, cut it into four, in sections, by drawing a vertical and horizontal line across the end, meeting in the centre. If too small for this, cut it into 4½-in. or 6-in. plank, as soon as possible after felling, and then stack *on end* out in the open: do not lay on the ground, but stand it as nearly *vertical* on its end as possible, and keep it *wet* during the first three months. If the weather is dry, well wet it with water poured on the top, and allowed to run down. Let the ends stand on a piece of quartering, to keep it out of the dirt, or it will be stained some distance up. After standing thus for some six months, after putting it in a dry place for some time, cut it into the scantlings you require, always bearing in mind that oak will, after this seasoning, shrink in, at least half an inch to a foot, in width and thickness. They should then be stacked, and stripped, and covered with spare boards, and weighted on the top, for at least six months,—as much more as possible,—in a covered shed, with plenty of air, occasionally turned over and shifted, till they are dry enough to make dust when planed, and not turn the shaving black. They will then be fit for use.

I should advise for the panels to be cut as *feather-edged* boards, in radial lines from the centre of the tree: it will be a waste of material, but will repay in the beauty of the wood, and the way it will stand without warping. Most of the panels of the stalls of our old cathedrals were rent *(not sawn)* in this way, and stand admirably.

ROBERT PHILLIPS.

THE NEW HOUSE THAT JACK BUILT.

A Sanitary Version for Grown Children.

TWELVE CUTS.*

PAPER'D and plaster'd and painted down,
Nicely placed in the skirts of the town:
This is the House that Jack built.

This is the roof and the soaking rain
Dripping right through in search of the drain,
In the New House that Jack built.

This is the nursery toss'd about,
Where smoke is kept in, and air kept out,
In the New House that Jack built.

This is the bed-room floor,—do you see?
And right at the end is the w.-c.,
In the New House that Jack built.

This is the gas-pipe, sctional view,
'Neath the floor, with a nail driven through,
In the New House that Jack built.

This is the view of the kitchen floor,
The maid, and her bed behind the door,
In the New House that Jack built.

These are the dogs and the ladylike cats
That would not harm the mice or the rats,
In the New House that Jack built.

This is the downward draught of the smoke,
Through the patent flue, designed to choke,
In the New House that Jack built.

This is the pump next the cesspit-wall,*
Showing the well-hole, source and outfall,
In the New House that Jack built.

This is a view of the stagnant drain,
Where gases rise and fall with the rain,
In the New House that Jack built.

This is the master, ill in his bed,
And that is the doctor at his head,
In the New House that Jack built.

This is the coffin and stately hearse
Of the luckless subject of my verse,
That died in the House that Jack built.

LIGHTNING AND CONDUCTORS.

SIR,—I have seen it stated in the papers that Crumpsall Church, near Manchester, which was destroyed by lightning on the 3rd inst., was furnished with a conductor. Will you kindly allow me to inquire, through the medium of your paper, what is supposed to have been the reason that the conductor failed to protect the building?

THOS. KNOWLES.

DAMP WALLS.

SIR,—I shall be obliged if any of your readers can tell me what many situated as I am would like to know, namely, how to keep out damp in an exposed position.

I have built a house on the borders of Dartmoor, using slate rubble for inside, and a light fireproof brick, made in the locality, for outside walls. These materials, with the aid of Aberthaw, having been put together in a very dry season, made the house a sieve, and for the first winter the house was wet through.

I next consulted some architect friends at a distance, who recommended me to give the outer walls a coating of a certain mixture of alum and soap. This was done, strictly according to orders, and the result was a second winter with the house wet through.

The following spring I had White's Portland cement put over the south and west sides of the house, to the ruination of its appearance, and, as far as I could judge, it kept the wet out, but the inner walls have nevertheless shown damp ever since (now two years), and I have had to batten.

A further portion of the house has been since coated with White's Portland cement, and has let in the wet as badly as ever.

I want to add to the house, but know of nothing suitable to build with. Battening does not keep out wet; it only hides it from sight by half an inch of plaster.

Can any of your professional or practical readers advise what, if any, solid building will effectually keep out wet? And if no solid building can be suggested, what is the best method of constructing double walls and bonding them together?

I have a dislike to paint and its periodical expense. Is there anything yet invented to supersede paint, of the consistence and waterproofness of tar, and that is made of a colour which is suitable?

I will only add that portions of the wall, painted externally with four coats, let in the wet as badly as ever after the first year.

DEVONIA.

DUSTMEN'S WAGES.

IN the St. George's, Hanover-square, Committee of Works, upon a complaint that dustmen had twice asked money for removing dust, Mr. Fearis said he had made inquiries, and found there were three men employed, who were expected to remove seven loads a day, the price being 6d. per load. This was 1s. 2d. per man per day, which, he submitted, was a price much too low. Mr. Mitchell objected to an imposition being practised on the ratepayers. If people liked to give the dustmen money voluntarily, well and good; but a demand of money was another thing. The Chairman suggested that the contractor should be written to for an explanation. Mr. Cove considered the best course was, for the vestry to be its own dust contractor, and see that the dustmen had a fair day's wages for a fair day's work. Dr. Schulhof suggested that the contractor be fined; upon which it was remarked that the price for removing the dust would be raised. The committee adopted the suggestion of the Chairman (Col. Ogilvy).

"POUR LES DAMES."

SIR,—Whether it be from a feeling of false delicacy, I know not, but the subject I will touch upon, with your permission, seems almost ignored. When our countrywomen are in France, their habits become somewhat Frenchified; and among many things to admire is the retiring accommodation there provided. What must foreigners think of our mock-modest style, where health is in many unavoidable cases sacrificed for appearance sake? Why are our large parks and promenades so destitute of accommodation, and why is the little that exists so carefully hidden from knowledge as well as sight? Why should private individuals be left to provide for so great a public want? Such provision must always be inadequate, more particularly so when payment is demanded for that which vestries ought to supply and care for gratuitously. Retiring-places, *pour les dames*, should be erected in convenient corners, and one section should be free, whether in park, or street, or railway-station. I am sorry that it has been considered necessary to close the free places at some of our principal London stations, for surely a better course than that could be adopted. Many persons there are to whom pennies mean bread, and to insist on payment by them is hard, to say the least. The sterner sex has less to complain of, but a comprehensive system might be instituted that would provide for all requirements, without being indelicately obtrusive.

LANTERN.

ASPHALTE PAVING.

THE Liverpool borough engineer (Mr. Deacon) has presented a report on this subject to the local health committee, containing information he had obtained on the subject of asphalte carriage-ways generally, together with the conclusions arrived at in relation to the probable advantages of their introduction into Liverpool, and suggestions as to the streets best adapted for a fair trial of two or more of the various asphaltes or asphaltic compositions now in use. Having referred to the experience of the use of asphalte in London and Paris, the engineer stated his opinion of its advantages and disadvantages in the following form:—

"The advantages to be derived from the use of asphalte, as compared with granite or other sets, are—First, comparative freedom from noise under heavy traffic; second, absence from dust in dry weather, and of mud in wet weather; third, cleanliness of the footways, the dirt on which is chiefly brought from the carriage-ways; fourth, increased comfort to carriage passengers; fifth, very great reduction in the wear and tear of horses and vehicles; sixth, reduction in the necessary width of openings to sewers and pipes; seventh, the facility with which repairs can be made, and their greater efficiency when made; eighth, the fact of the bed of concrete maintaining an even surface and reducing the difficulty which results from settlement after refilling openings for repairs of pipes, &c.; ninth, the small, bulk and increased value of the street refuse as manure (which should be collected as soon as it falls); the absence of necessity for watering except for cleansing purposes. The disadvantage inseparable from the use of asphalte pavement in Liverpool, as compared with the ordinary pavements, appears to be as follows:—First, the greater first cost; second, general inapplicability to gradients steeper than 1 in 60; third, the sudden change in the traction of vehicles in crossing the joints between this and any other pavement; fourth, increased difficulty of finding leaks in water or gas pipes."

Taking into consideration all the characteristics of asphalte carriage-ways, the engineer said the conclusion could not be avoided that there were disadvantages inseparable from their use which would be felt to a greater extent in Liverpool than had been the case in London and some continental cities. Many of the streets in which their benefits would be most obvious had too great a gradient to admit of their use. There could be no doubt, too, that the cost of granite or other pavement was much less in Liverpool than in those places where asphalte had been largely used, so that the relative cost of the latter would be higher. Notwithstanding such drawbacks, the advantages of this pavement

* The author would be very much pleased to see these lines practically illustrated in the interest of the public health. The readers of the *Builder* scarcely need it. No copyright reserved.

would not fail to be felt; and if, as seemed probable, several companies would undertake to lay down a portion of some street on trial at an expense to the Corporation little, if any, greater than the present cost of sets, there could be no reason why they should not do so. For the purpose of comparative experiment, such as would enable the engineer hereafter to report on the subject with greater precision, that portion of Dale-street between Hatton-garden and North John-street (comprising about 4,300 square yards) would be the best. In London the Val de Travers asphalte was estimated to cost from 1s. 6d. to 2s. 3d. per yard per annum for seventeen years, and at the end of which time it was to be left as good as new. The Montrolier Asphalte Company offered to lay down their asphalte pavement over such portion of Dale-street as might be allotted to them, and keep the same in good repair for a period of twenty years, receiving from the Liverpool Corporation the same remuneration for the work as would be paid for laying and keeping in repair that portion of the street if paved with granite sets. The Barned's Asphalte Paving Company tendered "for about 3,500 yards of asphalte paving for the carriage-road of any street in Liverpool possessing a gradient of not more than 1 in 40, the granite sets being removed, and excavations (if necessary) made to the depth of 8 in. at the expense of the Corporation." They added:—"We will, if with or without tramways, lay and furnish a concrete bed of about 6 in., and thereon lay asphalte of at least 2 in. thickness, thus furnishing the concrete, asphalte, and laying for the net price of 12s. 6d. the square yard; and we further undertake to maintain it in good order for the period of fifteen years, at the rate of 6d. per annum the square yard, reckoning over the whole surface."

The Health Committee have since come to the conclusion that it is not expedient to use asphalte far any of the roadways in Liverpool.

OLD WORK.

IN the course of a lecture "On the Decline of Gothic Architecture after the Fourteenth Century," recently delivered at a meeting of the Chester Architectural Society, Mr. A. Rimmer said:—

Much stress was laid upon the necessity of entering into Greek feelings and trains of thought before Greek architecture could be understood, and the repose of the flat surfaces of Pentelican marble among the igneous rocks of Attica. The Greek felt security in the Parthenon, which was the state treasure-house, as well as the Temple of Athena, and, raised up on a bluff that, as there was no artillery, nothing could injure. But to appreciate the ancient classic mind more fully we should go to some of the remote provinces of Rome, for of the parent city so little was left that we knew almost nothing; the only safe thing to say being that there is nothing in the present day that can give us any idea of it. The lecturer said, "Take Idumœa (Edom), a rocky fastness in the remotest parts of Arabia Petræa, and altogether unpromising for the hand of the architect," it was approached by a long winding road of four or five miles, that has no parallel in the world: sometimes it narrowed to a space of only a few feet, and sometimes spread out into deep caverns on each side, for the road went between enormous rocks, 400 ft. and more high, being three times the height, for example, of Chester Cathedral tower. Often the daylight was obscured by projecting cliffs, and the traveller seemed to go through a long tunnel with only a gleam of light far ahead. The mystery of this was proverbial before the Romans ever saw it. "Who will lead men into the strong city?" who will bring me into Edom? The marvellous Roman remains were dwelt on, and especially a vast temple that opened out to the astonished eyes of Captains Mangles and Irby (two of the few Europeans who ever were allowed to penetrate so far). They said, after describing the wonderful approach to Edom, covered with the remains of ancient Roman pavement, and having an infinite variety of grand sculptures, wherever there is light enough to see them;—"Where the precipices are at the highest, a gleam of stronger light breaks in at the close of a dark perspective, and opens to view, half seen at first through the tall narrow opening, columns, statues, and cornices of a light and finished taste, as if fresh from the chisel, without the tints or weather stains of age, and executed in a stone of pale rose colour. Warmed at the moment we came in sight with the full light of the morning sun, the dark green of the shrubs growing in this perpetual shade, and the sombre passage from whence we were about to issue, formed a fine contrast with the glowing colours of the edifice. We know not with what to compare this scene: perhaps there is nothing in the world that resembles it. Only a portion of a vast front is seen at first, but it is so contrived that a statue with expanded wings, perhaps of Victory, just fills the centre of the aperture, which, being closed below by the sides of the rock folding over each other, gives the figure the appearance of being suspended in the air." The rest of a grand design opened at every step. This was to illustrate the eye for the picturesque that guided the architects of old; and, speaking of Gothic, he said that the old designers of England fitted their buildings to the sites they stood in so precisely, that after the solid spires of Lichfield, that of Salisbury at first struck him as being lanky and too thin, and it was only when seen from various approaches on Salisbury Plain, covering over 200 miles, that he fully understood the picturesqueness of the sharp, incisive idea of height it was meant to convey. In order to design a building now, it would be necessary to make many drawings of the surroundings from the turnpike roads, and all the neighbourhood, to see where a stack of chimneys should show, where a front or a bay window, and where it should be partly hidden by a clump of elms or a hillock. This was not necessary formerly, for the old builders designed as they went on, and had all the accessories in their eye. A singular picture of the licence allowed to them may be found in the agreement for building the Troutbeck Chapel at St. Mary's, Chester, between William Troutbeck, esq., and Thomas Bates, mason. He describes the length and breadth, and says there must be "V, faire and clenely wrought windows full of light," the best to be devised, &c. But the most touching part of the contract, and one that no mason could read at the present day without emotion, is where he speaks of the height of the chapel, which is to be carried up "as high as it needs reasonably to be." This shows how little the workmen of those days cared about "jerrying" their work. Unhappily, none of this chapel is left, and a series of splendid monuments perished with it; among these was one to Sir William and Lady Troutbeck of great beauty: the lady's head rested on a head-dress that might excite no remark in the present day, but must have been impressive in the sixteenth century. It consisted of a wreath of Trout and a Moor's head. The real cause of the decadence of English art is explained in an eloquent passage of Mr. Gladstone's, where he says that the lust for cheapness and the contempt for ornament took away the occupation of the true artists of England, and they ceased; this culminated in the time of Cromwell, where every article of beauty was thought to be idolatrous and carnal; but baldness does not satisfy, and Mr. Gladstone says, "the law of nature arrives at its revenge," "we have starved out the race that knew the laws and modes of the production of artistic beauty," and end by producing "malformations at a greater cost than would have sufficed for the nourishment among us of chaste and virgin art."

EARLS BARTON CHURCH.

THE works of restoration at this most interesting old church are now in hand, under Messrs. Slater & Carpenter. The tower is so well known as a so-called Saxon relic, that it is needless to say much about it; excepting that beyond repairing the floors, nothing will be done to it, nor will the *original Saxon plaster outside be disturbed.*

The nave and aisles are wide and lofty, and of good Decorated and Perpendicular detail. These portions will have new roofs in character, and the defective stonework restored, and will be entirely reseated.

The chancel is a very interesting portion; it is of Norman date, and was originally terminated with an apse; but in the thirteenth century it was extended and finished with a square east end, having a noble triplet window. All along the Norman walls is a blank arcade, and the Norman sedilia and piscina are refixed in the later wall; above this arcade are the inner jambs of Norman windows, with rich chevrons worked on them; but the arches and the rest of the windows have disappeared, to make way for larger Second and Third Pointed windows. The First Pointed low side windows remain, with the hooks for the wooden shutters which formerly filled them.

The general effect of the chancel is a mixture of all styles, and in the restorations it was felt that all must be left to tell their own stories of the changes which passed over the chancel; but with the roof it was different, for this was nearly flat and very modern. A new roof of oak has therefore been put on, of a high pitch, and covered with lead, and with new stone parapets and corbel table to harmonise with the thirteenth-century work. This roof has moulded tiebeams and king-posts, and is boarded to cants with rib mouldings at and between the arched ribs of the trusses. On the north side a new vestry has been built with red and white stone courses, as the ancient work in the aisles. This has a low pitched roof, so as to finish under the corbel table of the chancel.

The cleaning of the internal stonework is not yet done, nor any fitting or floors. The magnificent painted oak rood screen has been carefully preserved in its old position. Some remnants of the old wall paintings have been discovered, and will be preserved. The builder employed is Mr. Allen, of Irthlingborough, and the clerk of the works is Mr. Lucas. Stained glass is in hand by Messrs. Bell & Almond for the three eastern lancets.

SCHOOLS OF ART AND SCIENCE.

Keighley Schools of Science and Art.—The annual meeting in connexion with these schools has been held, and the prizes distributed to the successful students. There was a fair attendance, but not so numerous as the important object of the meeting justified those interested in the school to expect. The chair was occupied by Mr. John Brigg, J.P. The report, in speaking of the new building, said,—

"As is well known, the superior and extensive accommodation of this building was provided with the definite purpose of supplying, as far as possible, many educational wants which had long been felt by the people of Keighley; and in order to show the importance of the undertaking, the extent of its development, and the influence which it must exert upon this community, it is desirable that we should revert to the educational position of the Institute a little over a year ago, and in a few words describe the means that were adopted to awaken public interest in the new system."

In reference to the Science School the report said,—

"It is very pleasing to announce that, although the school has but been in operation for eleven months, there are ninety-two boys attending it. It is largely taken advantage of by the leading manufacturers and employers of labour in the district; and yet, of the whole number, fifty-one are the sons of artizans. In order to keep up the scholastic requirements of so many, there are the following masters, and another is at present being advertised for:—Head-master, Mr. J. Spencer, M.R.C.P.; teacher of chemistry, Mr. G. Ward, F.C.S.; art-master, Mr. A. Stevenson; French and German master, Mr. T. A. Cawley; assistant master, Mr. G. H. Rollason; teacher of music, Mr. J. Midgley; drilling and physical exercise, Staff-Sergeant Atty."

Of the School of Art, Mr. Stevenson (head master) reports:—

"During the year ending Midsummer, 1871, there had entered the classes 145 students; 129 of these being in the evening classes and sixteen in the morning class. . . . The works (numbering 466) produced by 100 students, were sent to the Department of Science and Art for examination on the 9th April last. The result of that examination was satisfactory, the names of twenty-eight students being returned as having executed their work in a meritorious manner, ten of them being awarded prizes by the Government Examiner for the superior excellence of their productions. It is certain that at no former time have drawings of so high an order of merit been produced in Keighley. The excellent accommodation afforded in the new rooms, the extensive stock of examples and casts, and the valuable loans of works from the South Kensington Museum, have contributed to this result. Two free students have been appointed by the department and two by the council of the school."

In reviewing the rapid strides made in education since the new building was completed, the members of the council state that they are encouraged to continue the work which they have undertaken by the generous assistance which they have received from all classes in the town and by the hearty co-operation and assistance in carrying out their plans, of all the teachers and secretary of the institute. Especially are thanks due to Mr. Spencer, who has entered into and undertaken the work of organising and conducting the teaching of the trade school and evening classes with great enthusiasm and ability.

Mr. Mundella, M.P., addressed the meeting. He said he had heard before coming to Keighley from several impartial sources that the institution which he was going to see was almost without a parallel in England. Taking, as he did, a deep interest in mechanics' institutes, and desiring to see them the universities of the

working classes, he could not express to them the pleasure and satisfaction with which he had gone through that handsome building. He found that a town where there were little more than 20,000 inhabitants had built an institution like that, costing about 14,000*l.*, and that there were between 1,300 and 1,400 persons receiving some advantages from the institution—a great proportion very important advantages in the way of instruction. After all his experience of mechanics' institutes, that was the most spirited and most creditable undertaking he had ever witnessed. He could not help feeling, as he went from class-room to class-room and examined the models and the classes and the laboratories and all the auxiliaries of a scientific training, that although Keighley was a small town, it had got some people in it who had got long heads and large hearts. The annual exhibition of the work of the students of the art school has just taken place. The subjects shown are 113 in number, and are composed of the choice of 466 examples which were sent up to the Kensington department for examination.

The Derby School of Art.—The prizes and certificates obtained by the students of this school at the last Government examination have been distributed in the Lecture-hall, Derby. The chair was occupied by the president, Lord Belper. The Rev. A. L. Simpson read an address on "The Importance to Society of the Study and Culture of Art." The paper dwelt at length on the influence of art upon the mind and aspirations of men, and further expressed the belief of its writer that the realisation of the sublimities of art by man was the means of elevating his tone and character, and of leading him to look forward to the perfections of heavenly eternity, of which the fanciful dreams and longing aspirations excited in his mind by the study of art were but the dim foreshadowings. Mr. Jno. Rickards (hon. sec.) then read the report, which stated that—

"The Derby Central School of Art was opened on the 3rd of May, 1870; and the total number of students placed on the register for the year was 215. Of these, 24 joined the morning classes, and 19 the evening classes. Referring to a table recently issued by the department, it will be found that out of 113 Art Schools in the United Kingdom, at the last examination, only 48 obtained a place in the National Competition, and of these only 23 obtained more important prizes than Derby, so that in its first year the school has taken a distinguished position in the higher competition of the *whole* kingdom."

Mr. Simmonds, the head master, gave a brief outline of the course of instruction given in the School of Art. He condemned in strong terms the system of cheating adopted by many teachers of drawing throughout the country, who, in order to get a renewal of their lessons for the next quarter, systematically "coloured up," and in some cases even filled up the outlines of their pupils' drawings. The system, he concluded, which prevailed in his school was that recommended by Mr. Redgrave and other eminent members of the Royal Academy, and of these authorities he was but a humble, though he trusted successful, mouth-piece.

Books Received.

Strange Dwellings, being a Description of the Habitations of Animals. By the Rev. J. G. WOOD, M.A. London: Longmans, Green, & Co. 1871.

THIS abridgment, by the Rev. J. G. Wood, from his "Homes without Hands," makes a very pleasant little volume, calculated to interest, whether the reader has entomological tastes or not. We make an extract from Mr. Wood's account of wood-boring insects, which will serve to show the character of the book, while it conveys information:—

"The well-known worm-eaten appearance of furniture is caused by certain beetles belonging to another family. As may be seen from the dimensions of the tunnels, the insects are very small, and their bodies are nearly cylindrical. The ravages which these beetles cause are fatal to all who happen to possess old furniture; but Mr. Westwood mentions that one common species, *Ptilinus pectinicornis*, completely destroyed a new bedpost in the short space of three years. There is but one known method of killing the insects which have already taken possession, and of preventing others from following their example; namely, by injecting a solution of corrosive sublimate into the holes, and then treating the whole of the surface with the same poisonous liquid. I need, perhaps, scarcely mention, that insects which are popularly called death-watches belong to this family. Not only do furniture and timber suffer from the attacks of the ptilinus, but articles of dress and food are also injured by them. Specimens of natural history are often spoiled by the holes which are drilled through them by the beetles; and stationers sometimes suffer from the voracious insects, which bore holes through their wafers, fix them together, and there undergo their transformations within them. One species is obnoxious to wholesale druggists, on account of the damage which it does to the ginger. In some cases, half the ginger is drilled with holes, and rendered quite unsaleable. It is not, however, lost entirely, because it is reserved for the mill, and is then sold as ground ginger, the insects and their grubs being reduced to powder, together with the ginger which they have not consumed. Such specimens are of course not exhibited to the general gaze, as the public would be very cautious of purchasing ground ginger if they knew what it contained."

Rudimentary Magnetism. By Sir W. SNOW HARRIS, F.R.S., &c. Second Edition, revised and enlarged by HENRY M. NOAD, Ph.D., F.R.S. London: Lockwood & Co.

THIS second edition of a standard work has been posted up to the present state of the science of which it treats, by the Vice-President of the Chemical Society, who has so particularised what he has added that it can always be distinguished from the author's remarks. The volume is illustrated by 165 engravings, and forms a complete treatise on rudimentary magnetism. The editor's new matter relates chiefly to Faraday's latest researches, and to the recent important investigations by the Astronomer Royal and others respecting the deviations of the compass in iron ships. The eighth chapter is the editor's wholly, and gives a succinct account of the progress of terrestrial magnetism during the last twenty years.

Theory of Heat. By J. CLARK MAXWELL, M.A., F.R.S. London: Longmans, Green, & Co.

THE aim of this book is to exhibit the scientific connexion of the various steps by which our knowledge of the phenomena of heat has been extended. It shows that the whole science of heat is founded on Thermometry and Calorimetry, and issues in Thermodynamics. Energy and the Dissipation of Energy are pretty fully treated of; but still, although this branch of the subject is dealt with in a suggestive and interesting manner, our objection to Dr. Tyndall's definition of heat here also holds. When the author speaks of "the hypothesis that bodies consist of molecules, *the motion* of which constitutes *the heat* of those bodies," he does not give us a definitive idea of what heat as a force really is. Suppose "the motion" of a mass of molecules is towards each other, or concentrative, surely that is not *heat* in the mass, but is liker cold. And yet there is here a powerful force. Were the motion of the molecules mutually repulsive, or radiative, that would be like one's idea of heat in a mass, expanding, and even dissipating it; but this only shows that to speak of heat as being "the motion" of molecules or minute particles in a mass, is indefinite and incorrect. And, moreover, is not *motion* of any kind rather an expenditure of force than the force itself which causes the motion? Nevertheless, the volume before us is an able, and, as we have said, a suggestive one.

VARIORUM.

"A First Appearance," by Mrs. Evans Bell (*née* Magnus), is a very amusing and not uninstructive novel, recently published by Hurst & Blackett, and it has a claim on us for a sentence or two by its exposition of the loss and privation which poor weekly tenants suffer when they are obliged to leave houses condemned to be pulled down to make way for improvements. Too little consideration is usually shown for this class of tenants. If we had room, we would quote, too, a vigorous conversation on the value of the "Trattoria" system, especially as carried on in Rome, in the hope that it might lead to the establishment of some houses of the kind in London,—houses where a dinner can be ordered day by day for one person or for a family, cheap and good.

"You call at an establishment, order a dinner, say, for two persons, of six *plats*, soup, fish, *hors d'œuvres*, joint, game, and some sweet dish, besides vegetables and salad, to be sent every day. Henceforth at the appointed hour you find yourself, as if by magic, supplied with a perfect meal, beautifully brought to table, and served as hot as if brought straight from your own kitchen; for the dishes are sent ready garnished and fully prepared, on an iron tray, with a cover, round a charcoal fire placed in the middle of it, in a large tin-box:"—

and this for about 2½ francs each person. Mrs. Evans Bell has shown in her book, with a pleasant and a knowing pen, the troubles and dangers that beset a theatrical *débutante* in our many-sided metropolis. The story is dedicated to the ingenious author of "Domestic Life in Palestine," Miss Mary Eliza Rogers.

Miscellanea.

Sale of Woolwich Dockyard.—The portion of the dockyard sold is on the east side, adjacent to the centre of the town, and comprises upwards of four acres, including wharfage and warehouses, with a frontage to the river of 800 ft., approached by a new incline road about to be made in connexion with a public wharf which has been ceded to the local authorities by the Government. The property was divided into four lots, the first lot consisting of wharf property upwards of an acre and a half in extent, together with the mast-pond, a water area of 2 roods 29 perches, forming a complete dock and gates, which can be enlarged without difficulty, together with several buildings on the land, the whole having a river frontage of 303 ft. The upset price of this lot was 5,045*l.*; the lot was finally knocked down for 6,750*l.* Lot 2 comprised an area of 3 roods 33 perches, with a river frontage of 177 ft., and contains a shipbuilding slip 203 ft. in length. The upset price for this lot was 3,000*l.*, but there were no offers, and it was withdrawn. Lot 3, comprising nearly an acre and a half, with a river frontage of 220 ft., and a shipbuilding slip 258 ft. in length, was next submitted. The upset price was 3,150*l.* The lot was eventually sold for 3,950*l.*

Town Dwellings for the Working Classes of Manchester.—Mr. G. T. Robinson, F.R.I.B.A., has read a paper on "Town Dwellings for the Working Classes," before the members of the Manchester Statistical Society. Mr. Robinson said that, pre-eminent as Manchester had been for originating political and educational reforms, it was a striking anomaly that in this most urgent of social reforms it had hitherto taken no step. A great portion of the paper was devoted to the experiments made by the Metropolitan Association for Improving the Dwellings of the Working Classes, which endeavoured to secure a return for the capital invested. It also adverted to the Improved Industrial Dwellings Company, which had abandoned the open staircase system for the gallery system. To such a town as Manchester the gallery system, it remarked, was particularly applicable. What had been done by Sir Titus Salt in Saltaire, the Messrs. Crossley and Mr. Akroyd in Halifax, Mr. Hugh Mason at Ashton, and many elsewhere, was referred to. That which they, as individuals, had done from a sense of their responsibility ought, said Mr. Robinson, to be followed by collective effort in our towns. One attempt—and he sincerely hoped that it might be successful—had been made in Salford, but assistance on a much larger scale was urgently needed.

University College School Buildings.—At a recent session of the council of the College, the school committee represented the urgent necessity of an extension of the school buildings, in order to accommodate the rapidly-increasing number of pupils. Mr. Samuel Sharpe, a member of the council and of the committee, announced his intention to present the College with 4,000*l.* towards the cost of the required buildings. Mr. Sharpe had already given two sums of 1,000*l.* each to the School-Building Fund, besides 1,000*l.* to the Retired Professors Fund, and 600*l.* to the Fine-Art Building Fund. The College has recently received from Mr. J. Pemberton Heywood a second donation of 1,000*l.* to the School-Building Fund, besides 500*l.* to the Fine-Art Building Fund. At the same session, Mr. Felix Slade's executors stated that, as further aid was needed to defray the cost of the Fine-Art Buildings at the College, and to provide casts, &c., they would give 1,600*l.* for these purposes. About two years ago these executors gave 5,000*l.* towards the Building Fund.

The Crystal Palace Aquarium.—On the 12th inst. a *soirée* was given in the aquarium of the Crystal Palace, when some shareholders and their friends assembled in the tropical department to interchange congratulations on the success the undertaking has achieved since its establishment, to witness the additions made to the collection, and to listen to a lecture by Professor Flower "On the Structure and Habits of Fishes." The corridor, with its black marble tanks, containing many varieties of fish of large size, was illuminated from above. It was a study of sea-life under highly favourable circumstances.

The Registration of Trade Unions.—For the first time since the passing of the Trade Union Act (1871), 34 & 35 Vict., cap. 31, the Registrar of Friendly Societies, Mr. A. K. Stephenson, holds courts for the reception of evidence with reference to the registration of trade-unions. Mr. Secretary Bruce has just issued regulations by which the registrar is not allowed to register a trade-union under a name identical with that of any other existing trade-union known to him, whether registered or not registered, or so nearly resembling such name as to be likely to deceive the members or the public. Mr. Bruce has issued another regulation to the effect that upon an application for the registration of a trade-union which is already in operation, the registrar, if he has reason to believe that the applicants have not been duly authorised by the trade-union to make the same, may, for the purpose of ascertaining the fact, require from the applicants such evidence as may seem to him necessary. The split in the Amalgamated Society of Carpenters and Joiners, which took place last May, is the first case calling for the latter regulation to be carried into effect.

The State of the Thames at Richmond. A numerous and influential deputation from the Local Boards and vestries of Richmond, Twickenham, Isleworth, and Brentford, has waited upon the Thames Conservancy Board, at their offices, Trinity-square, Tower-hill, to urge the desirability of constructing a dock and weir at Isleworth, to improve the river between Brentford and Teddington. Strong representations were made by gentlemen connected with the district, as to the reduced and polluted state of the stream, especially at Richmond, occasioned, it was alleged, by the action of the Thames Embankment, the dredgings below bridge, and absorptions by the water companies. Mr. J. Thorp, deputy-chairman of the Board, said he conceived that the object desired was a high or low water level. That had been discussed at the Board over and over again, but it was difficult to find the means of accomplishing it without injury to the navigation. It was the duty of the Board to do their best for the whole river, not a part, and he could only say now that the subject should be further considered.

Geometrical Teaching.—The annual meeting of the Association for the Improvement of Geometrical Teaching has been held at the University College, Gower-street. The president, Prof. Hirst, F.R.S., referred chiefly to the superiority of the method of teaching geometry pursued in Italy over that practised in England. The object of the association, he said, was to bring up the level of geometrical teaching to the science of our day, and to endeavour to discover what unanimity there is among teachers by inviting contributions to the forming of a programme of a greatly improved method of teaching. He remarked that a perfect text-book was required, but such a book must be the work of a master-mind that had devoted itself for years to the subject. All teachers should aim chiefly at their own advancement; for only from a highly-cultivated instructor could proceed efficient teaching.

The Baroness Burdett-Coutts's Memorial. A public meeting has been held in the Hall of Columbia Market, in order that the proposed memorial to the Baroness Burdett-Coutts might be considered, and that the working men of Bethnal-green and Spitalfields might give expression to their wishes on the subject. The chair was taken by Alderman Sir Thomas Dakin. There was a good attendance, chiefly of working men. It was unanimously resolved, "That this meeting pledges itself generally to support the movement, and to confirm what the committee has done;" "That a committee be formed to collect subscriptions;" and "That an acceptable memorial be presented to the Baroness Burdett Coutts." It is to be hoped that only those who can afford it will be asked to subscribe.

Benhar Coal Company.—This Company has been formed for working the well-known valuable Benhar Coal-field, comprising more than 2,000 acres, held in lease by Mr. George Simpson, coalmaster, Benhar, Lanarkshire and Linlithgowshire, with the pits and mineral plant connected therewith. The mineral field is nearly equidistant between Edinburgh and Glasgow, and is intersected by branches of the North British and of the Caledonian Railways. The field is said to present the advantages of a superior coal at very moderate depth, little water in the workings, and easy access to many markets.

The Labour Question in the United States.—We read in the *New York Times*, of December 21:—"The House of Representatives yesterday passed the Bill introduced by Mr. Hoar, of Massachusetts, to provide for an investigation of what may be broadly called the labour question in the United States. Mr. Hoar proposes a commission of three members, to be appointed by the President, with the consent of the Senate, to hold office for one year, unless their labours are sooner completed. The Commissioners are authorised to employ a clerk, and are to receive a salary of 5,000 dollars each. The subjects to which they are to direct their inquiries are, the wages and hours of labour of the labouring classes; the division of the joint profits of labour and capital between labourers and capitalists; and the effect of existing laws regulating commerce, finance, and currency on the social, educational, and sanitary condition of the labourers."

New Lunatic Asylum for Kent.—The magistrates of the county of Kent have just determined to erect a new lunatic asylum, capable of accommodating 1,000 inmates. The county already possesses an asylum at Barming-heath, and there are upwards of 1,250 patients located there; but lunacy has so rapidly increased during the last ten years, and the operation of the Metropolitan Poor Act, 1867, having thrown large numbers of lunatics hitherto maintained in workhouses upon the county rates, the justices, to whom the matter had been referred, reported that there was no alternative but to build a new asylum. It has been decided to erect the new establishment in East Kent; and it is computed that the outlay will be from 150,000*l.* to 200,000*l.*

The Proposed new Surrey Chapel.—Some stir was produced at Surrey Chapel on Sunday morning, in consequence of an announcement by the Rev. Newman Hall, that the offer of a portion of the ground on which the Female Orphan Asylum, Westminster Bridge-road, stands, had been accepted for the sum of 8,000*l.*, so as to erect the new chapel thereon. Cards had been left in the pews, and by the evening 2,500*l.* had been collected. Mr. Samuel Morley, M.P., had given 500*l.* There is also a reserve fund of 12,000*l.*, which has been in the course of collection for many years. The new chapel will be commenced as early as possible, and is to have a lofty tower. According to the *Parochial Critic*, Mr. Ruskin is to be the architect.

Chester Workhouse.—The local guardians have resolved upon the purchase of a site for their new workhouse. Sixteen acres are to be taken, the place selected being in Hoole-lane, and the price 3,500*l.* The locality, says the local *Chronicle*, is not an undesirable one, and the price is not high. Some little doubt had been expressed about the drainage; but members of the board present stated that there was a good fall, and that no danger need be apprehended on that score. The site was the unanimous choice of the guardians; and, considering the long delay which occurred in the erection of the Town-hall from a division of counsels upon this point, that must be regarded as a fortunate and satisfactory circumstance.

Value of Property in London.—At the Auction Mart last week, Messrs. Fox & Bousfield, submitted to competition the freehold premises, No. 53, St. Mary-axe, containing an area of 2,000 superficial feet, in the occupation of the Board of Guardians of the City of London Union, under a lease granted some twenty years ago, and at a rent of 120*l.* a year. A keen competition ensued, which resulted in the sale of the property for 7,700*l.*, being at the rate of nearly 4*l.* per foot, equal to sixty-four years' purchase on the old rental. According to the *City Press*, a piece of land adjoining the Lombard Exchange, in Lombard-street, has been sold for 9,000*l.*, or about 19*l.* 4*s.* 6*d.* per foot super.

A Gasometer Destroyed.—One of the large gasometers at the Northampton Gasworks has been totally destroyed by wind, and upwards of 2,000*l.* worth of damage done. The wind was blowing a terrific gale, and caught the gas-holder, and caused it to tilt on one side, when the cast-iron columns, which are 2 ft. 6 in. in diameter, broke off, and one of the falling columns fell upon the top of the holder and made a large hole, through which the gas escaped, and the holder as soon as empty fell into the tank one mass of fragments.

New Docks at Milford Haven.—A movement has been started for the purpose of constructing docks at Milford, of such a size as will provide accommodation at neaptides for a class of vessels similar to the Spain and other new steamers belonging to the National Steamship Company. It is stated that vessels of this class could make to New York two more passages per annum from Milford than from Liverpool. The necessary Parliamentary powers by which the construction of the works may be proceeded with are in existence. The cost, as estimated by Mr. Hamilton Fulton, the engineer, is 600,000*l.*

Trade Halls and Social Clubs.—An interesting paper on the subject of "Trade Halls and Social Clubs for the Operative Classes" was read by the Rev. Mr. Solly, on Thursday in last week, at the National Congress of Trade Societies, at Nottingham. An opinion was expressed by the writer that the great obstacle to the establishment of such associations was the want of mutual confidence among working men. A resolution was adopted approving of the scheme propounded in the paper, as tending to promote social reform, and recommending its adoption.

A Town Sinking.—The Northwich Local Board have had a discussion as to the sinking of the town and the salt-producing districts around. The trustees are about to deepen the River Weaver to Winsford Bridge, and it is said that if they do not get an invert or a plank piling of the river round the town, the whole town would fall, or there would be an immediate subsidence, and eventually a collapse of the greater portion of the property of the town. The sinking in many places is caused by the river running through the quicksand into the old rock shafts.

The Sanitary State of Scarborough.—In consequence of the notoriety obtained by Scarborough through the remarks of the medical press with respect to the illness of the Prince of Wales, the Local Board have resolved to inquire into the sanitary condition of the borough, and have addressed a circular with schedule of questions to each householder. Information thus obtained will be used collectively, with a view to sanitary improvement; but particulars relating to houses individually will be kept in confidence. It is quite time something was done.

Hampstead Heath.—On Saturday, 13th the Metropolitan Board of Works took formal possession of Hampstead-heath, and dedicated it to the public. By the arrangement effected, the great bulk of the heath—that is to say, land consisting of the upper and lower heath proper, to the extent of, it is said, some 225 acres, is secured to the public for ever, at a cost of 45,000*l.* It is already being asserted that some of the most picturesque spots have been omitted in the purchase, and complaints are made.

Chester Walls.—The local *Chronicle* says,—"The foundations of some cottages are being laid at a spot which may be emphatically described as one of the very best sites in Chester. Outside the Castle walls, near the Grosvenor Bridge, and at a point singularly conspicuous, it has been considered a proper thing by the War Office to plant these small houses. They are intended for married soldiers." A pressing representation is to be made on behalf of the Town Council to the War Office against this senseless performance.

Church Struck by Lightning.—During a recent fearful storm of hailstones and thunder, which raged over the estuary of Loughor, the church at Penclawdd was struck by lightning, and much damage was done to the fabric. About 3 ft. of the point of the spire was knocked off, and a large hole was made through it lower down, close to the roof. Two windows at the west end were reduced to fragments, and a great part of the roof was either carried off or knocked in.

Opening a Public Hall in Sunderland. A large public hall, erected mainly by the friends of temperance, has been formally opened by the Mayor of Sunderland. The hall supplies a want which has long been felt in the town, namely, that of possessing a commodious building for political and other purposes. The hall is capable of holding 3,000 persons comfortably, and has been erected from designs by Mr. G. Gordon Hoskins, of Darlington, at a total cost of 9,500*l.*

Proposed Railway and other Works affecting the Holborn District. — The Surveyor to the Holborn Board, Mr. Lewis H. Isaacs, has reported on "the plans that have been deposited seeking for Parliamentary powers for railway and other works affecting the district." The report is published, and will be found interesting to those concerned. The value to the Holborn district of the proposed new thoroughfare from Vernon-place to Old-street is strongly dwelt on.

The Building Sites adjoining Finsbury and Southwark Parks.—At the last meeting of the Metropolitan Board of Works, on the motion of Mr. Newton, seconded by Mr. Savage, it was resolved :—

"That the officers of the Board be instructed to take no further steps for the present towards letting land for building purposes in Finsbury and Southwark parks; and that it be referred to the Parks, Commons, and Open Spaces Committee to inquire and report on the best means of utilising the land in question for the public benefit."

An Artesian Well.—An artesian well has been sunk in the courtyard of the naval hospital at Rochefort to a depth of 846 mètres (2,774 ft.). M. Roux, pharmacien to the hospital, reports that the temperature is 51 deg. cent. (about 105 Fahr.) Contrary to what is generally observed in artesian wells, the water contains a large quantity of saline matter, and is quite unfit for drinking or washing.

Club-houses for Working Men, Dundee.—Mr. Armistead, one of the members for Dundee, has presented 5,000*l.* to be expended in providing two club-houses for the working men. Several gentlemen are to be appointed trustees, but it is intended to leave the working men who become members to make the arrangements of the institutions themselves.

Bruton, Somersetshire. — The Sanitary Committee of this town have engaged Messrs. Gotto & Beesley, and Mr. A. W. Estridge, to prepare plans and estimates for the drainage of the town, and to report as to the best means of disposing of the sewage so as to prevent the pollution of the river.

The State of Yeovil. — The spasmodic endeavours now being made to remove some of the evil conditions that afflict Yeovil form a striking commentary on the reception given to our statements concerning the place made not long ago. An apology to us would not be out of place.

Royal Sanitary Commission.—On Monday evening, the 22nd inst., Mr. G. W. Hastings will open a discussion on the Report of the Royal Sanitary Commission, at a meeting of the Social Science Association, at their rooms in Adam-street, Adelphi, at eight o'clock.

The Wandsworth Mortuary.—At their last meeting, held this week, the Wandsworth Board of Works decided that the plans submitted for the proposed mortuary be approved, and that tenders be invited for the building from five local builders.

The Kew Instructional Institute.—The Kew Instructional Institute has been opened by his Royal Highness the Duke of Cambridge, in the presence of the principal inhabitants of the village.

The Floating Dock for Bermuda.—There appears to have been considerable bungling in placing this remarkable work in position. Considering that it cost a million of money, it has not hitherto received very careful treatment.

Park-lane Sewer.—Some abuse is being bandied about in connexion with the recent sewer works in Park-lane. Fresh inquiries are, rightly, to be made by the Vestry of St. George's, Hanover-square.

Drawing in Oxford.—Mr. Ruskin's to offer 5,000*l.*, for the purpose of an endowment pay of a master of drawing in the Taylor Galleries, has, with some modifications approved by Mr. Ruskin, been accepted by the University of Oxford.

Halesworth Sewerage Competition.—The Sanitary Board has adopted the scheme proposed by Mr. Bennett Fitch, C.E. There were seven plans sent in.

Edinburgh.—Arrangements are in progress for providing a new cemetery for Edinburgh.

TENDERS

For new granary, Prince's-wharf, Prince's-stairs, Rotherhithe, for Messrs. T. & W. Easton. Mr. George Loe, architect :—

Woodward	£5,650	0	0
Gammon & Son	5,213	0	0
Hill, Keddell, & Waldram	4,975	0	0
Crockett	4,950	0	0
Morter	4,910	0	0
Henshaw	4,890	0	0
Tarrant	4,797	0	0
Hart	4,786	0	0
Marriage	3,450	0	0

For excavator's, mason's, bricklayer's, carpenter's, and founder's work, of Upsall Castle, near Thirsk, for Captain E. Turton. Messrs. Goldie & Child, architects :—

Hopkinson	£10,306 0 0
Illingworth & Sons	9,367 0 0
Bulmer	9,365 0 0
L. H. & R. Roberts	8,847 0 0
Robson & Son	8,695 0 0
Keswick	8,670 0 0
Burmby	7,915 0 0
Bellerby	7,315 0 0
Shaftoe & Barry	7,100 0 0
Weatherby & Rymer (accepted)	6,250 0 0

For the erection of a house, &c., for a gentleman, in Kent. Messrs. John Tarring & Son, architects :—

	General Estimate for House, Stables, Lodge, &c.	Principal Staircase in Wainscot instead of Deal, additional.	For using Fareham instead of Red Suffolks, additional.
Kimberley	£5,906 0	£34 0	—
Dove, Brothers	5,375 0	40 0	£55 0
Myers & Sons	5,339 0	50 0	66 0
Hill & Sons	5,294 0	29 10	120 0
Macey	5,258 0	54 0	50 0
Henshaw & Co.	5,017 0	50 0	—
Kilby	4,999 0	50 0	—
Manley & Rogers	4,803 0	65 0	—
Perry & Co.	4,769 0	40 0	56 0

For the first portion of Messrs. Threlfall's new brewery, Liverpool. Mr. G. Scamell, architect. Quantities by Messrs. Curtis & Son :—

		Allowed for Old Materials.
Kirkham	£6,000	—
Tomkinson & Son	6,075	£250
Haigh & Co.	5,799	250
Burrough & Son	5,640	—
Jones & Co.	5,428	—
Urmson	5,671	250
Holmes & Nichol*	5,348	—
Ironwork.		
T. H. Head & Co. (accepted)	£1,076 0 0	

* Accepted.

For the erection of Blewbury Vicarage. Mr. Edwin Dolby, architect :—

		Deduct for Old House.
Johnson	£1,949 0	£20 0
Williams	1,750 0	25 0
Wheeler & Gregory	1,726 2	15 0
Kimberley	1,640 0	—
J. & T. Davis	1,630 0	—
G. Jones	1,620 0	40 0
T. Jones	1,620 0	50 0
Castle & Co.	1,565 0	40 0
Selby	1,558 0	70 0
Gibson, Brothers	1,537 10	70 0
Honour & Castle	1,428 0	45 0

TO CORRESPONDENTS.

T. W.—A. F.—H. A. P.—W. S.—W. S.—G. M.—B. F.—W. T. T.—Mr. E.—H. D.—Dr. H.—L. S.—J. P.—J. H. T.—T. & C.—G. & B.—A. H.—A. D. D.—G. D.—Dr. W.—W. C. A.—T. F.—R. G.—F. & Sons.—R. T.—W. S.—C. B. A.—M. U.—J. C. C.—J. A.—R. S.—W. G., sen.—T. A.—H. J. L.—X. X. X. (there is no royal road to the knowledge in question: it must be gained by observation and experience).—P. L. S. (properly used, concrete may be safely adopted).—H. W. R. (suggestions have often been made in our pages).—L. J. (we have already mentioned where subscriptions for Mrs. Randall may be sent).

We are compelled to decline pointing out books and giving addresses.

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VOL. XXX.—No. 1512.

The New Project for a Channel Tunnel.

ONCE more the question of constructing a tunnel under the Straits of Dover, which has so frequently been brought before the public, is upon the *tapis*. On the present occasion, it is right to admit, the previous projects have been pretty fairly reviewed. There is, moreover, a degree of diffidence, and a candid admission that many questions can be solved only by the test of actual experiment, that give evidence of a caution not always to be found in projectors. The subject, thus presented to the public, is by no means to be encountered with that ridicule which was very properly called for by some of the former schemes. Nor is it one to be met with a peremptory condemnation on positive engineering grounds. Investigation, however, of the proposed undertaking is desirable, whatever be the result of the best judgment that we may be able to bring to bear upon its principal features.

The first idea that occurs to the mind is, that the spirit of engineering enterprise, the absence or silence of which for so long a time too many of us have reason to regret, must have a more persistent vitality than has been generally supposed. Thirty thousand pounds, we are told, are asked for, and are found, or are expected to be found, for the purpose of experiment. Considering that the result of such an expenditure, if made as proposed, can be little more than to throw some additional light on the geology of a part of the English shore, with a distant hope, perhaps, that if anything should grow out of it the subscribers might be allowed to participate, the public spirit and disinterested munificence displayed are calculated to inspire us with long dormant hope. If such a sum be forthcoming for the mere purposes of investigation, what may not be expected for the accomplishment of those numerous practical methods of employing money in agricultural engineering, which, not as matter of estimate, but as subject of demonstration, would yield such golden return?

The object of the Limited Company, we are told, is to sink a shaft on the English side of the Straits of Dover, and to drive a driftway about half a mile beyond low-water mark. One question concerning the engineering practicability, or otherwise, of constructing a submarine tunnel, depends on the continuity, or the reverse, of the *strata* which are known to exist on either shore. That these dip towards a junction is ascertained. The inclination on the opposite sides of the Channel varies considerably, being nearly three times as sharp on the French side as it is on our own. The mode in which these anticlinal lines meet, the existence of a more or less serious disruption of strata at the junction,—in fact, the geological cause of the formation of the Channel itself, forms the real key to the engineering features of this part of the subject. What light is expected to be thrown upon this essential problem by the construction of a shaft and portions of a driftway at Dover we do not yet clearly make out.

The name of M. Thomé de Gamond is associated with that of several English engineers as concerned in the proposed enterprise. M. de Gamond, we are told, has for some thirty-seven years made a special study of the Straits of Dover. It scarcely justifies the scorn with which he speaks of competing projects, that the proposal, made by this gentleman in 1840, for a method of uninterrupted communication between Great Britain and the Continent, involved the filling up of the Straits of Dover. "*Point de Pyrénées*" was a joke to this. A solid and substantial mole was to be built from shore to shore. The modest sum of 34,000,000*l.* was allowed for the estimated cost; and the maritime power and supremacy of Great Britain were to be propitiated by the kind provision of leaving three gateways or navigable apertures through the mole. None but people who are ready to go to war for an idea could have been expected to originate such a scheme. More than that, no other people could be likely to appreciate it. The blind and incurable prejudices of the maritime interest could not be sufficiently enlightened to regard the grand project with favour. It shows a remarkable degree of confidence on the part of the promoters of the limited company, that they should put forth the name of the projector of this mole as that of one of their engineers.

Whatever be the practical experience, or the sound judgment, of M. Thomé de Gamond as an engineer, he seems determined to add the laurels to be reaped in another profession to the credit due to the constructor of magnificent works on paper. In 1856, M. de Gamond was occupied with a project for a submarine tunnel. He dived several times to the bottom of the Channel to obtain specimens of the clay, on the last of which occasions he was attacked and severely bitten by conger-eels. It does not appear how either of these interesting facts sheds much light on the subject of the geological substructure of the trough of the Channel. But as two objections—one political, the other engineering—were urged against the advantage and the feasibility of M. de Gamond's scheme, he says, that he was content to meet them by what advocates call pleas. These are explained to be statements introduced in order to gain the success of a cause. It is not proposed that, this success once obtained, any further reference is to be made to the pleas. One of these pleas seems to have been a relic of the original idea of the mole. Twelve artificial islands were to be manufactured in the Channel, in each of which shafts were to be sunk, from which the excavation of the tunnel was to be carried on in each direction. We are aware that the construction of a shaft through a species of artificial island was successfully carried out as a part of the water-works of Chicago; but the idea of studding the Channel with artificial shoals and invented dangers could only occur to persons ignorant of, or hostile to, that maritime occupation which forms the very life of British power.

The other plea, in reply to the objection that we were not anxious to abandon the military defence of that wall of salt water which has kept our soil unprofaned by hostile foot for 800 years, was, that valves might be provided for the inundation of the tunnel in case of its being required for invasion. As it is well known that all the preliminaries of war between hostile nations are now invariably arranged on the courteous and considerate plan which requested the "gentlemen of the French guard to fire first," we must take the second plea also for what it is worth. We must further note that the approbation which the ex-Emperor of the French is stated to have expressed of the project of uniting the two countries by a tunnel may be regarded under very different lights by French and by English eyes.

Mr. Low, of Wrexham, has brought to bear on the subject of the proposed submarine communication the experience of a practical miner; and has suggested, what we have ourselves more than once pointed out as a requisite of all lengthened tunnelling, that a double driftway connected by passages, and admitting of the mode of ventilation practised in ordinary coal mines, was the only method on which such an enterprise could with propriety be commenced. In reference to this, however, the improvements made in boring apparatus, and the aid to ventilation afforded by the escape of the compressed air by means of which such machinery is worked, have now to be taken into consideration.

For ourselves, we cannot but think that the political, or rather military, aspect of the case, is one that demands attentive consideration. Much may be said in favour of articulating our railway system with that of Continental Europe. Little doubt can be entertained that the international traffic that would be created by such a step would be very large. But other considerations must also be regarded. We have recently seen what large expenses the people of this country have incurred, and, as we think, wisely incurred, for making Portsmouth into an impregnable harbour for a war navy, intended to defend our coasts. Our annual budgets owe some three-fourths of their pressure to our efforts, past or present, to defend Great Britain from any possible attack. Works larger than any yet effected are known to be under consideration. The defence of London by a chain of detached forts is a subject on which military studies have been made, and as to which Parliament will probably be asked to provide means. There is no indication, at present, that it will be asked in vain. Unfounded security, and undue panics, have succeeded one another for some considerable time. Political capital has been made, at one time by short-sighted and eventually costly reductions of proper expenditure; at another by over zealous effort to repair these injuries to our power. The present feeling is, let us once for all put a stop to such discreditable vacillation. Let us see, since human nature is what it is, that our coasts are in a state of defence, our navy efficient, our army the very finest that can be formed out of such limited numbers, and then let us turn our attention to the conquests of peace. That, we think, is the common-sense outcome of all the long debates on the subject. It is matter, therefore, at least for consideration, whether we should be wise, at such a moment, to open in our ancient defences a new back-door, through which a robber might unawares break in. It is all very well to say that this postern shall be plated with iron, and provided with bars and locks. The question is, whether this is exactly the time to break through the wall to make it. The fortifications of Portsmouth and the Anglo-French Tunnel represent two opposite orders of ideas. Is it quite consistent to attempt the simultaneous prosecution of the two?

There is no doubt, were the incoming year to approach us, like the ambassador of Rome to Carthage, bearing peace and war beneath the folds of his toga, and asking which we would choose, what our reply would be. Peace and goodwill among mankind is, or ought to be, the aspiration of every good man. In none is that desire more strong than in those great military chieftains on whom has fallen the onerous responsibility of high command in actual service. There never was a man who had a keener sense of the horrors of war, or a more anxious, patriotic desire that his eyes might never witness their enactment in his native land, or indeed in

Europe, after his great struggle of 1815, than Arthur, Duke of Wellington. The blessings of peace, the growth of commerce, the augmentation of national wealth, the increase of human happiness, are matters which we not only desire, but in forwarding which to the utmost of our power we most of us pass great part of our lives.

For all that, we should be the worst of fools to forget the lessons of 1851, of 1866, and of 1870. Men whose philanthropy was much in advance of their knowledge of human nature, and whose acquaintance with the profits of commerce was much more accurate than their knowledge of history, had come to the conclusion that King Pocket's reign had come, and that the reign of King Pocket was peace. Our great brilliant summer palace of 1851,—that crystal and iron structure which had all the lustre, and something more than the permanence, of a bubble, was to be the temple of perpetual peace. Men's eyes were to be opened by education, their prejudices dispelled by mutual intercourse, and their peaceful relations secured by reciprocal interest. We know, however, what came of it. We have seen how an era of revolution and civil war, not ended, but suspended, by the most terrible military and national collapse on record, has been ushered in by these cries of "Peace, peace." What we do not know,—what few of us have heard, and still fewer realised, is the unprecedented magnitude of the river of human blood that has flowed during the past decade.

That calculation which earned an American general the title of butcher,—the calculation that if his forces were twice those of his antagonist, he might expend man for man and have half of his army left,—has been distanced altogether by the more ghastly arithmetic of the German war. We never heard of less than 150 men coming unhurt out of a battle, as the sole representatives of a regiment which went under fire 3,000 strong. It is no exaggeration to say that, in the earliest encounters, when the French had the advantage of admirably chosen positions, and of the destructive fire of the mitrailleuse, and before courage, discipline, and military character had been exposed to the demoralising influence of defeat,—the terrible word,—the once terrible word, decimation, had to be spelled backwards with regard to German regiments. It was not a tenth that they lost, but nine tenths. It is true that no other generals in the world would have dared so to handle troops. It is true that no other troops in the world would so steadily have marched to certain death. Over and over again, as a line of soldiers reached the summit of a hill, exposed to the deadly fire of the defenders, they fell, in line, like a swathe of grass in a meadow before the mower. Let us remember these things, and let us ponder well before we attempt to bridge the Channel otherwise than by steam. The oracle of Delphos gave a reply to the Cuidians, when they proposed to cut through the Isthmus of Corinth, that is not inapplicable to this question,—

> "Delve not, nor towers upon the Isthmus pile:
> Had Jove so will'd, himself had made an isle."

Neither the military events of 1870 and 1871, nor the internal condition of France since the close of the war, have been such as to lead us to suppose that the present is the exact moment in which to seek to alter the geographical relations existing between the British Islands and the Continent.

It may, it is true, be urged in reply that, even if the scheme be at once taken up, and carried out with all possible despatch, we need be under no apprehension of any very proximate political or military consequence, as it will take up the lifetime of a generation to make both ends meet. There is some truth in this argument. The experience of the longest tunnel yet made in the world bears, more closely than do such small details as those of the driving headways of 600 or 700 yards long through the upper chalk, upon the anticipations we can form as to the rate of progress. That actual rate, as we will show, would require the period of thirty-seven years for the completion of a tunnel beneath the Channel.

We do not treat this question as an engineering impossibility. Far less do we assume its practicability. We have made great advances within the last ten years in the art of mining. The success, engineering if not financial, of Mr. Barlow's little tunnel under the Thames, near the Tower, is a matter not to be ignored. Mr. Barlow, with commendable caution, constructed an iron tube as the shield for his miners, and the lining of his tunnel. Yet such was the combination of skill and good fortune in the selection of the impervious stratum through which the little gallery was driven, that we can say, from personal examination, that a 6-ft. culvert might have been driven through the clay, and bricked within, without the use of any shield at all. This is, no doubt, an exceptional case. It was due to the existence of a bed of solid clay, such as the results of no less than thirty-nine borings led Brunel to anticipate in the line of his own tunnel, which could be pierced and lined before any action of a semi-fluid nature had appreciably commenced. It gives us no encouragement with regard to working through pervious strata. Nor do we suggest that the favourable nature of the ground actually passed through would have justified any relaxation of the precautions adopted. Still, we have here a definite addition to our experience. We have an important fact to set against the terrible difficulties which the genius of Brunel overcame in carrying his work though the loose and crumbling material of what was really the artificial bed of the Thames. We must take either experience for what it is worth. Each is a contribution to engineering science.

Again, we have had the experience of the completed Mont Cenis Tunnel. That is another point gained. We have information under separate heads from this great work. We have found it to be possible to drive a tunnel, from either end, without shafts, of a length never before attempted, so as to meet both as to line and as to level. We are told that the error in coincidence of the two lines, one of 7,000 yards in length, and the other of 6,860 yards, was under 3 ft. This is a great triumph of engineering skill. Secondly, we have the experience of the boring apparatus. We know the economy of time and of cost thus effected over the manual labour familiar to our early days. We have also important observations as to the reduction of temperature by the use of compressed air,—a matter of extreme importance in contemplating the possibility of making 11 miles of unventilated tunnel. The difference of temperature at the entrance and at the working face is stated at 22 degrees Fahrenheit. What the latter would have been but for the jets of air constantly issuing from the working cylinders, and causing a descent of the thermometer exposed to the jet to 7 degrees of frost, our mining friends can readily estimate.

Again, as to the rate of progress, we have valuable information. From the date of the commencement of the tunnel, August 15th, 1857, to that of the meeting of the workmen under Mont Frejus, December 26th, 1870, was 4,880 days. Taking the greater distance accomplished, which was that on the Bardonnèche, or Italian side, at 7,000 yards, we obtain an average progress of 1·43 yards per diem. The long period elapsing before the tunnel was open for the transit of trains must be added to the above-named period; but as that delay was due rather to political than to engineering causes, it cannot be reduced to figures. Again, we have the element of cost. That of the Mont Cenis Tunnel, dividing the capital by the length, was somewhat under 200*l.* per yard. And rock of a very obstinate character occasionally occurred, which both retarded the progress and augmented the average cost.

A tunnel 22 miles long, executed at the rate and for the price of that under Mont Cenis, would thus require for its completion a period of thirty-seven years, at a minimum cost of seven and a half millions sterling. We are not arguing that the cases are parallel, but merely giving the results of a comparison. To offer even an estimate of cost, or to rate the progress, not by days, but by years, we must know more than any one appears to do at present of the geological nature of the bed of the Channel. The exact length of the Thames Tunnel is not stated in the Life of Brunel. The expenditure was 454,000*l.*; which, divided over the approximate width of the river, gives a cost of about 1,300*l.* per yard.

It will be said that the progress through the dense strata that underlie the Alps was necessarily slower than would be the case through those of the submarine tunnel. That a passage would be made through a mountain barrier consisting of chalk more rapidly than through one of harder material, we admit. But it must be remembered that there are very special practical advantages attending the driving of an adit, or working of a gallery or tunnel from two ends, as compared with working from shafts, which affect cost and rate of progress, as well as safety and comfort. A gallery thus driven is, or should be, always carried on a slight ascent, so that the drainage can be effected without engine power, and the material from the excavation is thus readily disposed of. The Alpine tunnel was constructed on a rising gradient from each end, although the so doing involved the introduction of a gradient of 1 in 43, instead of 1 in 90, which would have been attainable if the tunnel had been all on one inclination. In the Channel tunnel, on the contrary, we must commence by the sinking of a land shaft or shafts. The depth to be penetrated must be equal to that of the deepest part of the trough of the sea to be passed, *plus* the thickness of crust necessary to be left over the head of the workmen, *plus* the rise of an ascending gradient, steep enough to effect adequate drainage, of eleven miles. It will depend on the dryness or wetness of the strata pierced what this allowance is to be. Altogether we find that we must sink shafts of considerable depth,—in themselves matters of some expense,—up which every gallon of water that enters the tunnel must be pumped, and every ton of material excavated must be hauled. This may be fairly taken to counter-balance any presumed advantage from a less resisting medium.

On the important question of the geological character of the anticlinal beneath the trough of the Channel no light can be thrown by the proposed outlay. M. de Gamond considers that this meeting is under the Varne bank. If it should be practicable to make any serious investigation in this locality, the results might be important. To reach this place by driftways was reported, in June, 1868, by the engineers now concerned in the scheme, to require from one million and a half to two millions sterling, or one-fifth of the entire cost of the tunnel. The practical course, if the matter were seriously taken in hand, would be to drive a driftway from the shore nearest the point of supposed junction of the strata till that position was reached, or until reaching it was proved to be impossible. In that case we should have that positive information in the absence of which the scheme of a submarine tunnel can only be characterised as one that is extremely problematical.

There is, however, one primary consideration, in presence of which we must confess to some astonishment that the public should be asked to find 30,000*l.* without something like the same number of pence having been previously devoted to the purpose of showing that there exists even a *prima facie* case. One of the best known geological features of the earth is the riverless, streamless, condition of the great chalk wolds. In valleys and hollows where, in other formations, brooks and lakes are found, the chalk formation is dry. The reason is the pervious nature of the material. The rain sinks through it as through a sieve, and descends until arrested by an impervious bed. Nothing but excessive evaporation (as in the case of the Dead Sea and of the Bitter Lakes) is known, that can reduce the level of a great subterranean reservoir of water below that of low water in the sea. It is, therefore, our opinion, that the whole of the chalk below this level, without any assumption of infiltration through the bottom of the sea, is as full of water as a sponge. Through such a formation, subject, moreover, to a great hydraulic pressure, tunnelling would be extremely dangerous and costly, and the formation and maintenance of a driftway, unlined with masonry or with metal, would be an impossibility. We know that water is found at the level of the sea in chalk wells at Dover. We have reason to believe that the level of the subterranean lake which the chalk holds dips downwards from our inland chalk districts to the sea. The sinking of a single well for from 100 ft. to 300 ft. below the level of the sea through the chalk would be enough to verify or to correct this opinion. That, we take leave to point out, is the first step which ought to be taken by the promoters of a submarine tunnel. The information thus to be obtained would not, indeed, prove the practicability of the enterprise; but it might, on the other hand, demonstrate its utter impracticability. Engineering and geological theory are against that practicability.

We think no persons can with propriety appeal to the public for money until the simple step that we suggest shall have been taken. According to our best present knowledge we are asked for 30,000*l.* for an entirely impracticable scheme.

ON THE CONSTRUCTION OF THE ALBERT HALL.

AT the ordinary general meeting of the Institute, held on Monday, the 22nd inst., Mr. T. H. Wyatt, president, in the chair, a paper "On the Construction of the Albert Hall," was read by Major-General Scott, C.B. We give that portion of it which relates more particularly to constructive details :—

The whole of the main wall was constructed of hard Cowley stocks set in Portland cement with three parts of sand. Portland cement was also in all cases used for the concrete necessary to bring the gravel surfaces which were to receive the foundations to a true level, and to fill in the excavation in the clay bottom, which extended on the south and south-east sides over one-third of the area occupied by the building. The outer wall, built in bricks made by the contractor, was also brought up to the level of the shallowest footings in Portland cement mortar of the above composition; but all above this, and all the cross walls and the walls within the main wall were executed in mortar made in a mill, with one measure of grey lime previously slaked, one measure of Portland cement, and six measures of sand. The set of this mixture was sufficiently rapid to prevent any settlement taking place which might bring an undue strain on the terra-cotta dressings. It also enabled the main wall to be completed to its full height, and the roof to be commenced before the outer wall and cross walls were brought up, and in no instance did any such inequality of settlement from this cause take place as to produce fracture. The outer wall was, of course, delayed for the terra-cotta. Delay in the supply of this material appears to be an ever irritating difficulty in its use.

The plastering used on the interior walls merits, perhaps, some attention. Instead of making the lime into coarse stuff, as is usually practised, and finishing with lime or gauged putty, the grey chalk lime of the Medway was ground to a powder and made into mortar on the following system:—One quarter of a cubic foot of plaster of Paris was stirred into a bucket of water and thrown into the pan of an ordinary mortar-mill, so as to make a milky fluid of the plaster of Paris; another bucket of water or so was then added, and 5 cubic feet of the ground grey lime gradually added, with the addition of more water, the mill continuing in action the whole time until the pan contained a thin slip of the lime and plaster. To this mixture 30 cubic feet of sand were added and thoroughly incorporated with it, and the mortar was then ready for use. Thus treated the lime sets without slaking, and makes what I have termed "selenitic mortar."

For the finishing coat in rough stucco, the quantity of sand was reduced to 20 cubic feet, and after the first coat was put on the wall, the plasterers could in a few hours' time follow on with the finishing coat. For the first coating on lathwork the usual quantity of hair, but unbeaten, was added whilst the mortar was being incorporated, and the ceilings were finished with a mixture of slip prepared as before, with one part of chalk and two parts of sand for every part of lime used in the slip.

The whole of the outer corridors, staircases, and crush-rooms, and all the private and refreshment rooms round the building, are, as it is termed, fire-proof, no wood being used in their construction beyond that of the doors, windows, and the wood slips used to carry the concrete and tiled floors. Probably, in the case of a fire in the interior of the Hall, the title would not be belied, for the inrush of fresh air would be so great as to keep all without the auditorium perfectly cool. Since also the audience empties itself into these corridors and crush-rooms in a few minutes, there is no great likelihood of loss of life in the event of a fire occurring. As precautions against fire, hydrants are fixed at several points on each floor level, the whole being in communication with thirty tanks on the picture-gallery roof, containing in all nearly 50,000 gallons of water. These tanks are supplied from a well sunk through the London clay into the chalk, in the rear of the building, and they also receive the rainfall on the large roof. The hydraulic lift is supplied from the same sources.

In the warming and ventilating arrangements I had the assistance of Mr. W. W. Phipson, who has had great and varied experience in the heating of large buildings. Coils of hot-water pipes are placed in three separate air-chambers, under the arena, the amphitheatre stalls and the main corridors of the building respectively. The heated air from those in the arena ascends through the interstices of the floor; that from the coils under the amphitheatres through the risers of the steps on which the seats are placed; and that from beneath the main corridor finds its way through passages in the wall into the boxes, the picture-gallery, the corridors, the refreshment and private rooms and small lecture-theatres. The external fresh air is forced in by two fans, 5 ft. 9 in. in diameter, each worked by a 5-horse power engine, and blowing right and left through passages provided for the purpose into the three above-mentioned air-chambers. It may also be drawn through them by the ascensional current of heated air in the Hall itself, which, when the gas is lighted, or the building warmed in cold weather, exerts an enormous force. The amphitheatre and corridor air-chambers, with their systems of coils of hot-water pipe can be together utilised for the Hall, or for the corridors and private and other rooms. In order to preserve equality of temperature in all parts of these chambers, the coils of hot-water pipe are divided into sections, each section having its own hot-water generator, in which the temperature is kept up by a supply of steam from three 25-horse power steam boilers at the back part of the building. There are sixteen such generators, each supplying its own system of pipes, with and admitting of hot water being put into action or thrown out at will. The total amount of heating surface in the various coils is represented by about 28,000 ft. of 4-in. hot-water pipe.

The chief difficulty in connexion with the management of the warming and ventilation of such a building is the control of the inward draft when the doors are open from the ingress and egress of the audience; but by carefully attending at these times to the closing of the louvres of the upcast shaft through the centre ring of the roof, this draft can be controlled.

The conditions prescribed for the exterior were, as I have said, that the façade should consist of red brick, with terra-cotta dressings. The subject of terra-cotta as a decorative building material has been so fully treated of by Mr. C. Barry that it is unnecessary for me to do more in relation to its use in the Albert Hall, than refer briefly to the principles which guided us in its application and treatment. The terra-cotta material was considered simply as a superior description of brick, to be used in conjunction with plane surfaces of a somewhat similar material, but of another colour. It was thought therefore unnecessary that the lines and edges should have the precision of stonework given them, or that the blocks should be of large size. It was further judged that delicate modelling would be out of character with a building which must be of very massive appearance, and which should depend more for its effect on the sweep of its lines than on exquisite finish. These opinions were held strongly by Mr. Townroe, to whom the hall is indebted for the actual modelling or immediate superintendence of the whole of the modelling work, and I judged them to be correct. Many, undoubtedly, think that the modelling is too coarse, but I have been gratified to observe that the eye of the painter is generally pleased with the picturesque effect which this mode of treatment has imparted, an effect to which doubtless the varied and rich tints of the material itself have largely contributed.

The terra-cotta was all supplied by Messrs. Gibbs & Canning, of Tamworth. The blocks for the preparation of the moulds were supplied to them by us, and the terra-cotta work was fixed by masons furnished by the building contractors.

The terra-cotta of Messrs. Gibbs & Canning is prepared from fire-clay, without foreign admixture, and is burned at a high temperature, such as promises to render it very durable; the blocks are not made in the manner followed by Messrs. Blashfield & Blanchard, with cells which have to be filled in with concrete or grouting, but are chambered from behind, so that the brickwork of the wall can be built into them. It is necessary, therefore, in estimating the cost of fixing of this terra-cotta to allow for the extra brickwork necessary; but of course there is a saving of grouting and concrete, and it appears to me to make a better job than the blocks with the cells closed at the back.

The red bricks employed in conjunction with the terra-cotta were supplied by Mr. W. Cawte, of Fareham. They are very heavy and hard, having, if I may use the expression, a metallic-looking and slightly conchoidal fracture, are little absorbent, and are for beauty of tint unsurpassed by any bricks in the kingdom. I was indebted to Mr. Gilbert Redgrave for the whole of the work connected with the preparation of the terra-cotta, as well as for his general advice and assistance in every part of the work; and Mr. Verity was charged with the preparation of the constructive working drawings.

It will be observed that on the exterior of the wall of the picture-gallery in the original design the surface was broken with decorative panels of Geometric design. It was suggested to me by Mr. Henry Cole that this wall gave a fine opportunity for a mosaic picture of figures which he thought should be considerably larger than life-size. My assistant, Mr. Townroe, on the other hand, while he approved of the notion as much as I did, was strongly in favour of reducing the figures to nearly half life-size; and Mr. Gamble, who was much consulted throughout, and who was my boldest adviser in most cases of doubt, supported him. In this conflict of views, I resorted to the counsels of the weak and prudent, and adopted the middle course, which had to my mind this recommendation. The first idea of a spectator would be that they were life-size, and although the apparent magnitude of the building might be enhanced by a reduction of the figures, it was better that such an expedient for producing effect should not be attempted, as the balcony immediately below it, with or without living persons standing on it, would certainly reveal the truth. On the other hand, I saw no reason to reduce the apparent size of the building for the sake of a fine mosaic picture. The figures, by the advice of some of the artists who undertook to prepare the designs, were finally made something over full life-size. It was at the same time arranged that the colours should be buff upon a chocolate ground, and that the outlines should be black. These points were settled in conjunction with Messrs. Pickersgill, R.A.; Marks, A.R.A.; and Yeames, A.R.A. The other artists who contributed designs were Messrs. Armitage, A.R.A.; Poynter, R.A.; Horsley, R.A.; and H. Armstead. The frieze was divided into sixteen lengths of about 50 ft. each, some artists taking two or three such lengths, and the sum accepted in payment for the work was so moderate as to entitle these gentlemen to the warm thanks of all who are interested in the application of pictorial art to architectural buildings.

This valuable series of designs is exhibited this evening on your walls. They are drawn on a scale of 6 ft. 6 in. to the foot, and the task of enlarging them to the size of the proposed mosaic reproductions was entrusted to Sergeant Spackman, of the Royal Engineers, who was fortunate enough, as I believe, to make the enlargements to the entire satisfaction of the artists. He prepared small photographic negatives from the originals, and by means of a camera, illuminated with a lime-light, threw an image of the required size on to a screen covered with paper, upon which the necessary outlines were then put in with black lines. Sergeant Spackman, who is himself an artist, determined as a rule the thickness of the lines to be used, but on this point he consulted the artists whenever he was able to do so. The thicknesses of the tesseræ employed in translating these enlarged pictures varied from $\frac{1}{8}$ of an inch to $\frac{1}{4}$ of an inch in five gradations.

It would occupy your attention too long to describe the process by which the mosaic workers produced the actual ceramic pictures on the walls of the building, and I have said sufficient to enable an opinion to be formed of the feasibility of the more general adoption of this species of mural decoration. I would only observe that the flat treatment in this case was not selected from a conviction that it is in itself superior to a treatment in relief for exterior decoration, but because the latter mode would have been very difficult or impossible, for two reasons:—First, it would have been hard to find a body of modellers who could have executed in the given time 800 ft. of full-size figures in relief, with the same degree of excellence as could be secured by adopting the work of the painter instead of availing one's self of the sculptor's art. Secondly, if this difficulty could have been got over, the means at my disposal were quite insufficient to have met the expense of executing the work by the assistance of the latter. The total cost of the frieze, including the designs, their enlargement and fixing, was 4,426*l.*, and its area is 5,200 square feet. Has this decoration been too dearly bought? To say that another mode of decoration would be more effective, if that mode be impossible under the

conditions of the case, will not settle the question of the mosaic flat treatment being or not being one that ought to be repeated. In discussing the question, the facility with which the artist's work can be effectually rendered in mosaic work without much artistic feeling or knowledge of the human figure on the part of the operator ought not to be lost sight of. For modelling in relief every workman employed must be an educated artist, unless the architect is satisfied that want of art shall be the characteristic of the work. May I be permitted to suggest, also, in favour of a flat treatment, that in London soot deposits and birds' nests have somewhat marred the effect of the sculptured figures in the pediments of our public buildings?

The Messrs. Lucas Brothers were the chief contractors, and the well-known character of their foremen, their boldness in meeting the views of the architect, and their ability in coping with the most formidable difficulties did not forsake them here. For clerks of the works I had Mr. Hemsley, who showed the most zealous attention to his work; and Mr. Sankey, who superintended the preparation and fixing of the roof to my entire satisfaction. I was also much indebted for assistance to many other gentlemen, but I must not detain you by particularising the nature of the assistance they rendered. I ought not, however, to pass over the name of Mr. Charles Stephenson, who afforded me great assistance throughout the whole work.

DISCUSSION ON THE REPORT OF THE ROYAL SANITARY COMMISSION.

A MEETING was held at the Rooms of the Social Science Association, Adam-street, Adelphi, on Monday evening, January 22nd, when a discussion took place on the Report of the Royal Sanitary Commission. Mr. George Godwin presided.

The Chairman, in commencing the proceedings of the meeting, said that it was of the greatest importance that steps should be taken to keep the subject then to be considered before the public. We had just recovered from the alarm caused by the gloomy anticipations of what would have been a frightful loss to the whole community; and the cause of this was intimately connected with sanitary matters. Public opinion was in a state of excitement on the subject. Whether this excitement would speedily pass away with no definite result, as had been the case on many similar occasions, and whether the Legislature would act with effect, remained to be seen. It was their duty to urge the necessity for the consideration of sanitary measures, and of proper steps being taken to put matters on a better footing than now. He had heard, on other subjects, measures proposed in meetings of this Association, which at the time were not listened to by the general public, or were denounced as impracticable, but which afterwards had been generally adopted. He trusted that the present discussion, which he then invited Mr. Hastings to open, might have a good effect, and that in a matter which concerned the public good so much as the present, we might speedily see a great change.

Mr. G. W. Hastings said the Report of the Royal Sanitary Commission had a very wide scope; but in his opinion the chief points in it were, firstly, the constitution of the Board, to which it was proposed to entrust the carrying out of the measures to be adopted; and, secondly, the executive officers who were to be their agents. He was not sanguine that a complete measure of sanitary reform would be speedily passed, and he doubted if the subject could be dealt with satisfactorily in a short period of time. If one or two points could be settled in the next session, and those upon a right principle, we should have made more progress than if the whole subject were considered and settled hastily. The present arrangements in regard to sanitary matters were absurd, and often involved a conflict of authority between those who had charge of the different departments of the same work. To reconcile those conflicting local authorities, or supersede them by a better arrangement, was a very desirable thing. He had formerly expressed the opinion, which he still maintained, that in rural districts the proper authority in such matters as these was the county or its principal officers. In towns of some size the town councils might have the control, as being the best available body. In the rural districts the great obstacle in the way of improvement was the intervention of private interests. The only way to eliminate this was to raise up an authority which would be superior to it. He thought that this authority might be confided to the Justices in Quarter Sessions. In addition to other qualifications, he believed the fact that they were not elected was an important one. The representative principle did not suit every case, and this was one to which he thought it wise not to apply it. The proposal that the present Boards of Guardians should exercise this authority in sanitary matters he did not agree with. He understood that Mr. Stansfeld was in favour of a County Board of Guardians to be chosen by the present Boards from among themselves. This plan would amount to a virtual disfranchisement of the present *ex officio* members of the Boards. Mr. Goschen's plan to give half the seats on the Board to the ratepayers, and half to the Justices, was more in harmony with his own ideas. This was a kind of revival of the old County Courts. The School Boards had been offered as a model, but these were far from being free from bias, and the objects for which they existed did not in every case have the first place in the minds of the members. He thought that should the election of sanitary Boards be confided to ratepayers, the efficiency of the arrangements would be not so much considered as the question of expense. The calm judicial mind which the Board of Justices would bring to bear upon such matters as questions of compensation, and other sources of dispute, would be highly useful. In matters which now come before these bodies, the impartial and impassive way in which they are considered, was a noteworthy fact. In the higher functions of politics, the necessity of separating the different departments was apparent, but this necessity did not exist in matters of local government. He, therefore, should not object to the union of legislative and judicial functions in the proposed Boards. In regard to the officials to be employed under the Boards, the wisest plan would be, he thought, to obtain the services of a few highly-trained men, and pay them well, rather than to endeavour to multiply officers with insufficient payments. One or two such officials would be able to serve each county efficiently. The geography of the Poor-law Unions was useless for sanitary purposes; to carry these out properly, we must follow the watersheds. There should be no such conflict as we have now; but all matters of irrigation, sewage, and such like should be brought under the notice of one authority. Each county can now appoint an analyst; and this appointment had been of great service. In like manner, the county might appoint its one or more health officers. If such a measure were enacted, it would be a step in the right direction,—an instalment of a future more perfect measure. In conclusion, he hoped the meeting would not be content with the small areas proposed by the Report, but would recognise the principle that the wider the legislature the more likely it would be to work satisfactorily.

Mr. Webster, Q.C., condemned the proposed small areas, and agreed with the principle of making the watersheds the sanitary districts. He thought the Justices would make very bad sanitary administrators, and desired no half-measures, but a complete and comprehensive scheme of reform.

Dr. Rogers spoke of the impracticability of entrusting sanitary matters to Boards of Guardians. He favoured the idea of committing them to the Court of Quarter Sessions, and thought a system of sanitary inspection might be arranged with great effect.

Dr. Rumsey coincided with Mr. Hastings in nearly all his views. He thought the Commissioners had done a great work. If they had done nothing else, they had shown what was to be accomplished. He condemned the proposed multiplication of small bodies, as destructive of efficiency. The large centres of population might be treated as the counties, in regard to the establishment of local Boards. He thought, in a general way, it would be best to follow the old lines in the apportionment of districts.

Dr. Lankester agreed in the main with Mr. Hastings's remarks. He thought it was impossible to carry out the plans of the Commissioners. He could not say anything in favour of Boards of Guardians, but must confess that he was just as much afraid of justices. He thought there should be an independent Controlling Board, similar in its constitution to the Board of Works. The present action of sanitary authorities, as, for instance, in their doings in relation to the prevailing epidemic of small-pox, was highly unsatisfactory. He desired to see a Central Board of Health established with power to enforce sanitary measures in every village.

Dr. Stallard differed in several particulars from what had been said. All the arguments of Mr. Hastings were directed against the representative principle. But he thought people could not be taxed for the support of what they did not believe in. He thought we must take the present local machinery and use it as best we could. He preferred the Boards of Guardians to the Justices. The Controlling Boards should be elected directly, and not sifted through Boards of Guardians. The best area, he thought, was that of the present unions, of which combinations might be made, where requisite, by the central authority.

Dr. Little was not disposed to wait for a complete measure until people were educated.

Dr. Stewart hoped whatever Acts might be passed that they would not clash the one with the other. He would refer the meeting to the joint report of the British Medical and the Social Science Associations in reference to the education question.

Mr. Frederic Hill made a few observations, concurring generally with Mr. Hastings's opinions.

Mr. Chadwick desired that the areas of districts should be extended, and these should follow the watershed. The engineer and the architect were important agents in the work of sanitary reform. We must look for improvement, in all the particulars, to the great landowners. He instanced the efforts of the late Duke of Northumberland in this direction as offering an example worthy of imitation. The officers he thought it was advisable to appoint by competitive examination, and not by nomination.

The Chairman said he thought no one could consider the report of the Commissioners as absurd, a term which had been used by one of the speakers, although we might not be able to agree with them in all their recommendations. There seemed to be in the meeting a unanimous opinion that Boards of Guardians were not the right bodies to trust for sanitary improvements, and that mixed Boards, consisting of magistrates and selected guardians, were preferable. He thought so too. Also that there should be superior officers of health, sufficiently paid to abandon private practice, with the Poor-law medical officers as assistants. One omission he might notice in the Report: the necessity of attention to good construction in sanitary works was not referred to. The ventilation of sewers, which should be made a law, was but just touched upon in the Report. He hoped the discussion would have some influence in the settlement of the question, especially as there was such unanimity on the main features. We could not wait till the education of the community was completed. Years had passed, and comparatively little progress had yet been made. The advancement of the human family should be the great aim of our efforts, and in our progress towards this end we should spare neither time nor money.

ON THE INFLUENCE OF GAS AND WATER PIPES IN DETERMINING THE DIRECTION OF A DISCHARGE OF LIGHTNING.*

ALTHOUGH the invention of the lightning conductor is one of the noblest applications of science to the wants of man, and its utility has been established in all parts of the world by the experience of more than a century, yet a sufficient number of instances are recorded of damage done by lightning to buildings armed with conductors to produce, in the minds of some, an impression that the protective influence of lightning conductors is of but questionable value.

The destruction, by fire, of the beautiful church at Crumpsall during a thunderstorm on the morning of the 4th inst., has induced me to bring before the Society, with a view to their being known as widely as possible, some facts connected with the electric discharge which have guided me for some years in the recommendation of means by which disasters of this kind may be averted.

For the proper consideration of this subject it is necessary to make a distinction between the mechanical damage, which is the direct effect

* By Mr. Henry Wilde. Read at a meeting of the Manchester Literary and Philosophical Society.

of the lightning stroke, and the damage caused indirectly by the firing of inflammable materials which happen to be in the line of discharge.

Instances of mechanical injury to buildings, not provided with conductors, are still sufficiently numerous to illustrate the terrific force of the lightning stroke, and at the same time the ignorance and indifference which prevail in some quarters with respect to the means of averting such disasters; for wherever lofty buildings are furnished with conductors from the summit to the base, and thence into the earth, damage of the mechanical kind is now happily unknown.

Even in those cases where lightning conductors have not extended continuously through the whole height of a building, or where the lower extremity of the conductor has, from any cause, terminated abruptly at the base of the building, the severity of the stroke has been greatly mitigated, the damage being limited, in many cases, to the loosening of a few stones or bricks.

The ever-extending introduction of gas and water pipes into the interior of buildings armed with lightning conductors has, however, greatly altered the character of the protection which they formerly afforded, and the conviction has been long forced upon me that, while buildings so armed are effectually protected from injury of the mechanical kind, they are more subject to damage by fire.

The proximity of lightning conductors to gas and water mains, as an element of danger, has not yet, so far as I know, engaged the attention of electricians, and it was first brought under my notice at Oldham in 1861, by witnessing the effects of a lightning discharge from the end of a length of iron wire rope which had been fixed near to the top of a tall factory chimney, for the purpose of supporting a long length of telegraph wire. The chimney was provided with a copper lightning conductor terminating in the ground in the usual manner. In close proximity to the conductor, and parallel with it, the wire rope descended from near the top of the chimney, for a distance of 100 ft., and was finally secured to an iron bolt inserted in the chimney about 10 ft. from the ground. During a thunderstorm which occurred soon after the telegraph wire was fixed, the lightning descended the wire rope, and instead of discharging itself upon the neighbouring lightning conductor darted through the air for a distance of 16 ft. to a gas-meter in a cellar of an adjoining cotton warehouse, where it fused the lead pipe connexions and ignited the gas. That the discharge had really passed between the end of the wire rope and the lead pipe connexions, was abundantly evident from the marks made on the chimney by the fusion and volatilisation of the end of the wire rope, and by the fusion of the lead pipe. As the accident occurred in the daytime, the fire was soon detected and promptly extinguished.

Another and equally instructive instance of the inductive influence of gas-pipes in determining the direction of the lightning discharge occurred in the summer of 1863 at St. Paul's Church, Kersal Moor, during divine service. To the outside of the spire and tower of this church a copper lightning conductor was fixed, the lower extremity of which was extended under the soil for a distance of about 20 ft. The lightning descended this conductor, but instead of passing into the earth by the path provided for it, struck through the side of the tower to a small gas-pipe fixed to the inner wall. The point at which the lightning left the conductor was about 5 ft. above the level of the ground, and the thickness of the wall pierced was about 4 ft.; but beyond the fracture of one of the outer stones of the wall, and the shattering of the plaster near the gas-pipe, the building sustained no injury.

That the direction of the electric discharge had, in this case, been determined by the gas-pipes which passed under the floor of the church, was evident from the fact that the watches of several members of the congregation who were seated in the vicinity of the gas mains were so strongly magnetised as to be rendered unserviceable.

The church at Crumpsall is about a mile distant from that at Kersal Moor, and the ignition of the gas by lightning, which undoubtedly caused its destruction, is not so distinctly traceable as it is in other cases which have come under my observation, because the evidences of the passage of the electric discharge have been obliterated by the fire. From information, however, communicated to me by the clerk in charge of the building, as to the arrangement of the gas-pipes, the most probable course of the electric discharge was ultimately found.

The church is provided with a copper lightning-conductor, which descends outside the spire and tower as far as the level of the roof. The conductor then enters a large iron down-spout, and thence is carried into the same drain as that in which the spout discharges itself. Immediately under the roof of the nave, and against the wall, a line of iron gas-pipe extended parallel with the horizontal lead gutter which conveyed the water from the roof to the iron spout in which the conductor was inclosed. This line of gas-piping, though not in use for some time previously to the fire, was in contact with the pipes connected with the meter in the vestry, where the fire originated, and was not more than 3 ft. distant from the lead gutter on the roof. As no indications of the electric discharge having taken place through the masonry were found, as in the case of the church at Kersal Moor, it seems highly probable that the lightning left the conductor at the point where the latter entered the iron spout, and by traversing the space between the leaden gutter and the line of gas-piping in the roof, found a more easy path to the earth by the gas-mains than was provided for it in the drain.

In my experiments on the electrical condition of the terrestrial globe * I have already directed attention to the powerful influence which lines of metal, extended in contact with moist ground, exercise in promoting the discharge of electric currents of comparatively low tension into the earth's substance, and also that the amount of the discharge from an electro-motor into the earth increases conjointly with the tension of the current and the length of the conductor extended in contact with the earth. It is not, therefore, surprising that atmospheric electricity, of a tension sufficient to strike through a stratum of air several hundred yards thick, should find an easier path to the earth by leaping from a lightning conductor through a few feet of air or stone to a great system of gas and water mains, extending in large towns for miles, than by the short line of metal extended in the ground which forms the usual termination of a lightning conductor.

It deserves to be noticed that in the cases of lightning discharge which I have cited the lightning conductors acted efficiently in protecting the buildings from damage of a mechanical nature, the trifling injury to the church tower at Kersal Moor being directly attributable to the presence of the gas-pipe in proximity to the conductor. Nor would there have been any danger from fire by the ignition of the gas if all the pipes used in the interior of the buildings had been made of iron or brass instead of lead; for all the cases of the ignition of gas by lightning which have come under my observation, have been brought about by the fusion of lead pipes in the line of discharge. The substitution of brass and iron, wherever lead is used in the construction of gas apparatus, would, however, be attended with great inconvenience and expense, and moreover, would not avert other dangers incident to the disruptive discharge from the conductor to the gas and water-pipes within a building. I have therefore recommended that in all cases where lightning conductors are attached to buildings, fitted up with gas and water pipes, the lower extremity of the lightning conductor should be bound in good metallic contact with one or other of such pipes outside the building. By attending to this precaution the disruptive discharge between the lightning conductor and the gas and water pipes is prevented, and the fusible metal pipes in the interior of the building are placed out of the influence of the lightning discharge.

Objections have been raised by some corporations to the establishment of metallic connexion between lightning conductors and gas mains, on the ground that damage might arise from ignition and explosion. These objections are most irrational, as gas will not ignite and explode unless mixed with atmospheric air, and the passage of lightning along continuous metallic conductors, will not ignite gas even when mixed with air. Moreover, in every case of the ignition of gas by lightning, the discharge is actually transmitted along the mains, such objections notwithstanding. A grave responsibility, therefore, rests upon those who, after introducing a source of danger into a building, raise obstacles to the adoption of measures for averting this danger.

* *Philosophical Magazine*, August, 1863.

LONDON AS IT IS, AND AS IT MIGHT BE.*

THE general aspect of the streets of London, even the principal ones, is commonplace, uninteresting, and even ugly; and, compared with the advantages gained, a very trifling expense would make an astonishing difference in this. What a difference, again, is there between London and Paris in this respect. There it is a pleasure in the best quarters to walk from one part of the city to the other: the fine broad boulevards, lined with trees, stretching in every direction; the fresh clear air; the white stone façades, rich with carving and sculpture; the tasteful shops, almost everywhere, make Paris the very pattern of a capital city. And this is my apology fer referring to it so often in this paper.

The effect to Londoners coming back from Paris to their own dirty city, with its long rows of uninteresting brick-built streets, typified by Gower-street; its monotonous squares; its filth and its smoke, is disheartening in the extreme; in fact, it is only through the principal thoroughfares, such as Oxford-street, Regent-street, or the Strand, where the shops and the throngs of people afford some amusement, that the pedestrian would care to loiter in London. Those of us who live within the town usually rush about from point to point by cab, underground railroad, or omnibus, our only thought being to get to our destination as soon as possible. Thus what might be a healthful exercise, becomes a fatiguing strain on the nerves.

I do not mean to say that there is not more solid and finer architecture in some parts of London than in Paris itself, such as the clubs about Pall-mall, the mansions round Hyde Park, and several great public buildings; and in the City, too, there are whole streets of architecture which, for boldness and originality, and solidity of construction, are far superior to Parisian. But it is all hidden in narrow streets and courts, and if you were to turn up your head to look at it, you would be carried away or knocked over by the rushing crowds below; in fact, the only time to be able to really see it is on Sundays, or on the early morning or late evening of a summer's day, when those busy millions have left off their toil for a time, and drawn off to the suburbs. But all the street architecture of London, with very few exceptions, is isolated from the surrounding buildings in style and character; and very often placed where it can hardly be seen at all to advantage.

Where the Parisians have the advantage of us is in the arrangement of their towns and streets. Nothing is hidden; all can be well seen, and nothing seems monotonous or devoid of interest. Now, it is a great reproach to us that Paris should be so beautiful and London so ugly. We cannot have and we do not want here a Napoleon and Baron Haussmann, to cleave lines of street right and left, regardless of cost, and indifferent to private interest; but we ought, at least, to do our very best to find out some way to remedy the evil. Is it possible to suggest some plan, for instance, by which a walk from University College to Oxford-street, down Gower-street, might be a pleasant stroll; or a walk along either the Edgware-road or Euston-road a pleasant or interesting one? Some will say we ought to build in white stone instead of brick. This may sound very well in theory; but it is impossible and out of the question. If London cannot be made to look interesting in brick and plaster, it is pretty certain that it will have to remain in its present ugliness, unless there be some revolution in our systems of leasehold and notions of economy. What we want is, to find some plan by which, without wholesale pulling down and building up, the existing London can be materially improved; and there are some improvements of this sort that seem to me to be obvious and easy of carrying out. The most important of these is a system of boulevards, lined with trees, in every direction, without, however, forming any new streets, or running to any great expense. No place could be more favourably circumstanced than London for constructing these useful and beautiful features of a large city. There are numerous, almost countless, broad roads in every quarter, of which I will take Euston-road or Pentonville-road as a familiar type, which has once been suburban, and have been lined in the main by private houses, with small gardens in front. As the town increases these roads become required for

* By Mr. Alexander Payne. See p. 40, *ante*.

shops, which are accordingly built out on the front gardens, one story high, and decorated on the top with all sorts of fantastic plaster casts, zinc-ware, &c., forming about as ugly a road as can well be imagined. Now, all that is wanted to turn these roads into magnificent boulevards would be to build the shops under the houses in the ordinary way, and to make use of the part now occupied by front gardens for wide foot-paths, bounded by trees. This might be attended with some expense in buying up the gardens; but this would be as nothing compared to the immense gain, which would entirely transform London into a new city; and it is highly probable that the property on each side of the roads would be so increased in value as to pay for the expense. Where there was much room to spare, as there would be in many cases, narrow gardens, with flower-beds and seats, might be formed under the trees; and where the underground railroad went underneath, shafts could be provided, by which that useful line would become less sulphurous and tunnel-like than at present.

It seems to me that, after clearing the air from smoke and dirt, the next urgent want is to introduce nature into London. We want nature's trees and flowers wherever we can find a place for them. The Embankment, with its gardens, and the beautiful flower-beds that have appeared of late years in the parks are steps in the right direction; but we want a great many more such steps. We want more public squares laid out as gardens, with fountains and seats. The parks are so far distant from one another that it is quite a journey to get at them; but if we had occasional public squares or gardens, however small, we could, in a long walk, put up with a dingy street or two for the sake of the gardens. I do not hesitate to say that it would be an immense gain to the occupiers of private squares themselves if they were all thrown open to the public; for instead of the privilege of paying a guinea or two for the right of entering one dingy square, and shutting everybody else out, they would have the right of entry into all for nothing; and they would also see hundreds enjoying a sniff of fresh air, and little healthy cheeks glowing, which but for that square would have been stived up in some pestiferous street, as they are now. This would be the way to educate the people, and do as much good as half a dozen British Museums. Why should not Leicester-square, for instance, be made a public garden? Is its present condition such a boon to its private owners or the neighbourhood that it cannot be given up? The lack of a place to sit down and rest your weary limbs is a terrible want in London, as at present. Let a stranger go down to the Embankment on a summer's day. He is, perhaps, tired, and wishes to sit down and watch the river; but there are no seats. Why on earth are there no seats along the Embankment? Happy thought,—he will go into the gardens across the road: his only view, it is true, will be the well-known ruinous brick buildings that uphold the architectural glory of London in this quarter; but, at least he can rest his weary limbs. He repairs to the garden, and he sees about five or six seats, each thickly studded with nursery-maids and children, who do not look as if they had the slightest intention of giving them up. A policeman, perhaps, tells him there are plenty of seats in Hyde Park; but, as he does not wish to walk three or four miles for a seat, he repairs either to the waiting-room of a railway-station or to some refreshment-room, where he purchases the luxury of a seat with a cup of coffee or a chop, which he does not want.

But, in the next place, we have many streets in London with and without shops which it would be impossible to turn into boulevards, and where we could not introduce trees or squares. Is there any way of improving this ordinary street architecture of London without pulling it down and rebuilding it. Most of our houses and shops have a facing of stone, stucco, or brick: those of stone are usually the aristocrats of the neighbourhood, of considerable architectural pretensions, and an example to the rest of the street: what is wanted is to "level up" the others (to use Mr. Disraeli's expression) to the same point. With regard to the stuccoed ones, I know of two examples, which prove that it is quite possible to make any ordinary brick house look artistic and interesting without facing it with stone or marble. I refer to Novello's music establishment in Berners-street, and to the confectioner's, in Oxford-street. Nothing could be plainer than the structural part of Novello's warehouse, which is simple brick and stucco, but is so tastefully decorated in patterns in colour as to afford as much pleasure as many an elaborate stone building; and the same system might, of course, be pursued with any stuccoed building. The confectioner's is more elaborate structurally than the other, but far the greater part of its ornaments are in colours. This seems to me to be an entirely new and useful field for architects;—given an ordinary stuccoed house—to make it look artistic and interesting; unless, indeed, we are to utterly despise stucco, and decline to stoop to house decoration of this sort as beneath our notice. If this be our line of action, we shall probably be deserted by the public, who will turn to engineers as a more useful body, and leave us to feed on the glory of our æsthetic ideas. I hold our true course to be to make the best of everything, even paint and stucco, and despise no materials that are given us to work with; and by so doing I think we shall follow in the footsteps of the best of our predecessors. But, if stucco can be decorated, what can we do with brick? A little while since, a prize was offered to gentlemen of this Association for the best design for the front of an ordinary Gower-street house, and in answer several very pretty designs were sent in; but, I believe, in every case the idea was to pull down the front and rebuild it; and the objection to this is that it is very certain very few, if any, of the people in Gower-street will pull down the fronts of their houses and rebuild. But how are they to be made artistic and interesting without pulling them down? I confess this question seems to me a poser. I cannot imagine one of these houses in Gower-street looking interesting without pulling down the front and rebuilding it. I can only suggest,—put some flower-trays in front of every window; put some large pots or boxes in basement area, and train creepers on trellises up the front if they will grow. Perhaps some one will be able to suggest a better way.

Time warns me I must pass on to my last point,—"That there is a want of general supervision in London from a fine-art point of view." Nothing is more striking in London than the utter confusion and want of plan in the place taken as a whole; it is more like a collection of towns than one town, and the streets wind about and bend here and there in a sort of fortuitous manner, as if their position were the result of chance. The rights of separate individuals everywhere seem to override the public advantage, and the same is apparent in the motley architectural character of the streets. One man has his warehouse or shop built in Classic; his neighbour adjoins thereto a Gothic building, without the slightest attempt to make it accord in any way with the former one. I think Regent-street is the only street of any architectural pretensions in London which has anything like similarity or unity of design about it; in other cases the only attempt seems to be to make each separate building look well *per se*, without considering whether it is in harmony with the rest of the street of which it forms a part. Another thing most noticeable in London is the number of untidy uglinesses which mar almost every view.

If any man carries on any business in a town which is offensive to the sense of smell or hearing you can prosecute him as a public nuisance; but he is allowed to offend against your more subtle sense of sight, by putting up some monstrosity which is a perpetual eyesore, with impunity. I must say this seems to me quite as great a nuisance as the other.

Let any one, for instance, examine the different views of London on the north side of the river from the various bridges or points along the Embankment; he will hardly find a single view which is not spoilt by one of these eyesores, which would not be tolerated for an instant in the best parts of a Continental city.

What was the use of the consummate art with which Wren designed the beautiful spirets of the City, in perfect harmony with his glorious masterpiece—St. Paul's,—so aptly termed the "mother and daughters of London," when every view is marred by the introduction of some factory chimney or huge gasometer, which might at least be banished to the other side of the river; or by such specimens of fine art as Charing-cross and Cannon-street Railway Stations?—the one adorned with a couple of sow's ears towards the river, and the other left in native ugliness.

I am sure I shall not be accused of exaggeration when I say, that there are far more blots, blemishes, and general untidyness about views of London, and English cities generally, than Continental ones.

Are we to draw a deduction from this, that the English are naturally deficient in taste, as compared with other nations? This may be partly true, and the lack of unity of plan so discernible in English cities no doubt has its rise in that individuality and love of freedom which is one of the cardinal points of the English character; but I think more must be laid to the door of that strong current of Puritanism which has set in so strongly in Christendom for the last two centuries, and especially in England. If this age is anything, it is a utilitarian age. This, no doubt, is a virtue; but it has carried its utilitarianism so far as almost to despise beauty in its love for utility. Ornament of any sort, and all things beautiful, have been thought fit for Oriental and effeminate nations, or perhaps for the French, but quite beneath the notice of practical Englishmen. Fortunately for us, however, the love of beauty is a goddess and heavenly-born, and cannot be slain by any age, however fanatical,—not, at all events, while nature pays her such worship in her glorious architecture, where beauty and utility go hand in hand. Hence we see the strong reaction in favour of fine art that has undoubtedly set in. Large sums are annually spent at South Kensington and Schools of Art generally to educate the people in this important subject. So far so good; but surely the streets should not be allowed to counteract what is learnt at the School of Art.

There are several other points I should have liked to take up, in connexion with this subject, such as the desirability of providing accommodation in flats for all classes; and the advantage of building houses higher, with wider streets and openings between. At present very many quarters of London are taken up with numbers of small houses, designed for only one family, but generally occupied by two or three; but these things have been amply dealt with elsewhere, and they are such large subjects of themselves that it would be quite impossible for me to go into them this evening. I will therefore close my paper simply by recapitulating what has been said,—namely, that London is dirty, smoky; that its streets are monotonous and devoid of interest; that there is a lack of arrangement and fine-art supervision; that it might become clean; that its air might be purified, and much of the smoke prevented; that the character of its streets might be entirely altered, by formation of boulevards and other improvements; and that, under proper supervision from competent persons, its blemishes might be gradually removed, and it might become one of the grandest and finest, if not the grandest, city of the world, instead of one of the dingiest; and my hope that it may and will become so must form my apology for taking up the time of the Association with a paper on "London as it is and as it might be."

In the discussion which followed the reading of this paper at the Architectural Association, Mr. Blashill said he was afraid London could hardly be expected, as things stood, to be a clean place, even in the well-attended-to thoroughfares. It was a place of business of very heavy traffic, and looked upon as such by the influential people who belong to it. The English people, with power of choice, had not been a town-loving people, as our neighbours the Parisians are, for example; and this difference of sentiment had hitherto affected, and will continue to affect the question. No one, however, disputes that improvements may be usefully made. The City, for instance, seems likely to undertake the cleansing of footways within its jurisdiction; doubtless to be followed by other similar changes. As to the chimney-cowls, he was afraid that Continental cities were as badly off as ourselves. In a recent visit to Geneva, he had noticed that a chimney without its contorted piece of zinc was an exception. He was afraid Englishmen would never submit with any pleasure to dictation as to the appearance of their freehold houses; he for his part thought that attempts at uniformity in London streets were pretty generally failures, destroying the picturesque and individual character so much to be wished for, and unluckily dictating more often than not a by no means pleasing type of building for unmeaning repetition.

Mr. G. Herbert West said that one point with reference to works carried on in Paris necessary to be noted in any comparison with London was sometimes overlooked. People did not consider that the continuance of the Paris of Louis Phi-

lippe's time had become impossible; it was then a fortified city of the Middle Ages, with some modifications; change was absolutely necessary in order to open up the city and fit the communications to the traffic. Visitors to Paris saw what appeared on the surface; but those who knew it thoroughly, from living there and from long special investigation, did not feel inclined to compare it with London as in every respect superior. The main thoroughfares certainly are kept clean; but the back streets, with their narrow pavements, 1 ft. 6 in. to 2 ft. 6 in. across, and wide mud-filled gutters, are very bad; in these places Paris beats London hollow in bad weather. Again, in Paris, the street mud is washed into the sewers, a course hardly possible in those of London, which, in fact, convey little but water. Paris yet retains the cesspools that London has to a large extent got rid of, as is evident to the nose in walking in the streets after eleven o'clock at night,—perhaps the worst evil of the two. Asphalte roads, with proper attention, may be kept clean with less difficulty than granite or macadam; but the at times dangerous slipperiness,—the impossibility of stopping in any reasonable distance a vehicle driven at a fair pace,—is a drawback felt much at Paris, as no doubt it will be here, unless in some way avoided. The old regulation in Paris that houses should be cleaned once in every ten years, might be applied to London. A jet of steam and water were used for some time, with the effect of removing about one-eighth inch of stone on each occasion. The custom now seems to be to use a sort of hearth-stoning process, and soap and water. He called attention to the portico of the Athenæum Club-house as a sample of work in London cleansed at intervals; the process pursued was, he believed, to rework all faces and mouldings, a method that must be stopped at some time. As to the smoke in Paris, it certainly was less than in London, in consequence of the different habits of the people. For 6,000 or 7,000 francs a year, an apartment would be rented containing a couple of reception-rooms, one not large bedroom, two smaller, and a kitchen; of course the accommodation for such a rental in London would be much larger, but the French have smaller families than the English, and with the smaller number of rooms fewer fires for warmth are required. For cooking, charcoal in a pan, put out when done with, is the substitute for the kitchen fire in England. Coal is burnt much more now than formerly, but wood always by preference; the ashes are habitually heaped up at the back, maintaining a fire at once economical and producing little smoke. Up to the 1st of January, 1860, when the fortifications were made the municipal boundary, instead of the octroi wall of 1784, as formerly, the city of Paris contained hardly any manufactories; and, since 1860, many have been removed, in order to avoid the octroi; thus their smoke and fumes are kept away. On the question of general aspect he could say but little for London,—it perhaps deserved all that had been said of it; but he could not praise new Paris without reserve: after a time the regularity, the long level lines of cornices, the repetition without ceasing of similar features, coupled with painfully bad masonic construction, all tended to make even the most favourable critic heartily sick of the whole,—as a mass of pretentious mediocrity, for which had been destroyed too many of the features of the city, that, of all modern cities, possessed at one time the most noteworthy collection of sites and buildings,—lodged in the minds of all cultured people for their historical or intrinsic interest. The site of the Hôtel de la Trémouille, one of the most splendid works of the fourteenth century, is all that the inquirer after such buildings finds now. The passion for perfectly straight streets became, a while ago, a perfect mania; the Hôtel de Cluny was, it is true, saved by a *détour*,—a rare example; buildings newly illustrated in books five years before are now almost forgotten altogether. The process so thoroughly carried on in Paris could not be looked, perhaps not wished, for in London;—a personal, almost uncontrolled, direction of finances and public works like that of Baron Haussmann would not be allowed. The Prefect of the Seine, named directly by the Emperor, chose, subject to the Emperor's approval, the members of the municipal commission. The financial questions may be illustrated by the fact that the ordinary receipts of the city from 1852 to 1869,—from octroi, centimes communaux, estates, markets, &c.,—amounted to 40,000,000*l.* The outlay on works in the annexation and new parts of Paris has been 14,000,000*l.*; of the works in old Paris, 18,680,000*l.*; of the extraordinary works (the large new streets, &c.), 52,000,000*l.*; making in all, 85,000,000*l.* In 1864, Baron Haussmann ceased to ask aid from the State; the Central Office of Works began the issue of bonds, which gave an available income of from 4,000,000*l.* to 6,000,000*l.*, subject to the yearly consent of the Corps Législatif. This, however, was not found sufficient, and the new streets were mortgaged to contractors as they were made, and also the future income of the city. The law of expropriation, pressed well into the service by Baron Haussmann, gave his autocratic power still more scope. He had the power of taking all the property required for a new street, and a great space on either side of it. Formerly (by the law of 1841) the Corps Législatif decided on the question of "Public Utility;" but after the decree of 1852 this was decided by the Emperor alone. These few facts, and many more could be cited with the same tendency, would illustrate the arguments that might be used to show that Paris, and the public works there, in the views at least of Englishmen, might fairly perhaps be spoken of with less thorough respect, both as to the works themselves and some of the processes of effecting them, than was the almost universal custom.

DOINGS IN EDINBURGH.

THERE is not much appearance of activity in the building trade here at present. The demand for private residences has fallen short of the supply; and the other works on hand are few, and of no great magnitude; but there is a good prospect of a considerable number of important works being inaugurated in the course of the year.

The Gilmore-place Free Church is being roofed in; but the tower is still incomplete. Mr. Pilkington has in this instance refrained from freaks and eccentricities: there is a breadth and masculine simplicity about this church much more satisfactory than the restless efforts at originality which characterised his former works.

An Independent Church at Caledonian Crescent, Dalry, is nearly completed. It is the first effort of Mr. Alexander Heron. Funds do not seem to have been plentiful, and the building appears somewhat weak and superficial. The outline of the spire is far from pleasing. It would have been better had that feature been dispensed with, and more depth and solidity imparted to the body of the church.

The foundations for the new Infirmary have been taken out, and building operations will be commenced forthwith. This building will be of considerable magnitude, and the ultimate cost is estimated at about 200,000*l.*

The line of new thoroughfare from the Waverley Station to Canongate, to be known as Jeffery-street, is nearly cleared out. In this street the long-delayed Trinity College Church is to be built. The plans have been prepared by Mr. Lessels, after the style of the ancient edifice, which was erased to make way for the extension of the North British Railway Terminus. The building will be oblong in form, having a tower and spire rising to the height of 115 ft. at one angle of the main gable, and a turret starting from the ground, and roofed with stone, at the other. The chief doorway is a reproduction of that in the transept of the original, and the window above is from the same source.

The apse and two bays of the original choir, together with the clearstory and vaulted roof, will be re-erected at the rear of the new portion, to serve as a hall for congregational purposes. It is to be placed diagonally to the church proper, from which it will be separated by an ornamental wooden screen, the upper portion of the two arches being left open. The interior of the church itself will be of a common-place description, with galleries supported by iron columns ranging round three sides of it.

Another new church is talked of as being likely to be erected in Chambers-street, the new thoroughfare to the north of the college. In the formation of this street it was found necessary to demolish the School of Arts, and a new and superior building, designed by Mr. David Rhind, is to be erected, at a cost of 8,000*l.*, upon a site to the west of that occupied by the premises which have been erased. At the east end of this street it is proposed to erect a hall for the use of the University, to be dedicated to Sir Walter Scott; and a scheme for a new theatre in the same locality has been mooted. A movement has been set on foot to have a town-hall, which is greatly needed in this city; it may also form one of the group of public buildings in this locality. Altogether Chambers-street is likely to be the centre of attraction in the old town.

The new Waverley Bridge is being actively pushed on, and when it is completed the new station will be proceeded with. This is a very desirable improvement, for the existing station is in every respect quite unworthy of the city. As the large piers of the North Bridge interfere greatly with the platform arrangement, it has been proposed to substitute an iron girder bridge for the stone one, but funds are not forthcoming. At all events, the roadway of the bridge is to be widened, and, if a new bridge be not constructed, this is to be done by throwing out projecting footpaths on either side, and adding the present footpaths to the driftway.

The trustees under the Walker bequest have at a late meeting set aside 45,000*l.* for building the new cathedral. In this sum the cost of an organ, stained-glass windows, peal of bells, &c., is not included, so that it is not improbable that the ultimate expenditure may be double that sum. Six architects,—three from each side of the border,—have been invited to submit designs. The competing architects are Messrs. Scott, Street, and Burges; Messrs. Peddie & Kinnear, and Lessels, of Edinburgh, and Mr. Ross, Inverness. We trust that this competition may lead to a more satisfactory result than has been the case in some recent instances of a like nature. A complete scheme for the allocution of the remaining part of the trust funds, which are to be employed in erecting and endowing additional churches, has been agreed upon, but it has been thought desirable, before taking further steps, to have the opinion of counsel upon certain doubtful points.

The Union Bank of Scotland have acquired an extensive frontage in George-street with the view of building new premises there, which, it is said, are intended to equal if not to surpass in grandeur the other banks in this city; and probably no city in the world can show such an array of palatial edifices devoted to this purpose. Mr. David Bryce is, we believe, likely to be employed as architect.

Rumour has it that a new insurance office is to be erected at the angle of St. Andrew-street and Register-street, an excellent site for architectural effect.

The Tramway Company are anxious to push on the remaining portions of the line of rails, but they are not at one with the local authority. The steep gradients in many parts of the city have proved obstacles to the satisfactory working of the tramways; during the existence of hard frost it was with great difficulty that the large carriages were drawn up Leith-street, even with the aid of extra horses: lighter cars should be provided.

THE DUKE OF EDINBURGH'S COLLECTION, SOUTH KENSINGTON.

His Royal Highness the Duke of Edinburgh has obligingly sent to the South Kensington Museum the drawings made in illustration of his cruise round the world in the *Galatea*, by Mr. Brierly and Mr. Chevalier, together with selections from the objects of science, art, and curiosity collected in the course of it. The catalogue which has been prepared shows that there are 37 sketches by Mr. Brierly, 96 drawings by Mr. Chevalier (both the artists have done their work well), and 784 objects in the general exhibition. The collection, as a whole, is full of interest, regarded from many points. Some will be struck with the evidence it affords of the eager kindness with which the Queen's son was received throughout the colonies and dependencies of the empire; others will regard it as a valuable indication of the disposition and tastes of the owner, and of his consideration for the general pleasure; those who look closer will see that it affords many important lessons to our own people; while all will find it an interesting exhibition of things curious and beautiful. It has been well set forth by Mr. T. Clack and Mr. C. Townshend, of the Department; the birds, of which there are two grand cases, were arranged by Mr. Ward, the naturalist; and the arms, a beautiful collection, are shown in the shape of trophies, at the suggestion of the Duke himself, Messrs. Wilkinson & Co., of Pall Mall, assisting. Some of these arms present exquisite specimens of enamelling, metal chasing, mechanical ingenuity, and coloured decoration.

The articles from Japan include works in bronze, black and gold lacquer, and textile fabrics, unapproachable in this country. Notice, for example, the bronze incense-burner in three stages, given to the Duke by the Mikado (102); the box, of black and gold lacquer, containing various games (559); and the remarkable dress of blue crape representing the sky, and gradating downwards to a sedgy landscape at bottom, with birds flying. However, we have no intention now of pointing to all that is noticeable in the exhibition; our object is to send our readers to study it for themselves. We will only add that the collection of gold and silver trowels, jewelled and mother-o'-pearl'd and malachited, with which first stones of public buildings were laid in our colonies, is a marvel; and in viewing the engrossed addresses that chronicle the events the expert will notice with surprise the skill with which some of them are illuminated.

ALTAR VESSELS FOR ST. PAUL'S CATHEDRAL.

IN 1810 the altar-plate belonging to St. Paul's Cathedral was stolen, and from that time to this copper gilt vessels have been used. At the cost of several persons, silver gilt vessels have now been prepared by Messrs. Lias & Son, of Salisbury-court, Fleet-street;—a large flagon, the gift of the Rev. W. J. Hall; two chalices and patens, presented by the Rev. W. Sparrow Simpson, F.S.A., who has taken particular interest in the work; other chalices and patens given by Miss Hale and Mrs. Melvill; and a large and costly alms-dish, presented by Mr. Joshua W. Butterworth, F.S.A., in memory of his late father; some of the other gifts, we should say, are also *in memoriam*. The flagon ("16¾ in. high, chased with wheat and grapes, relieved by bright flutes, in the style of the Renaissance; the body enriched with six medallions, containing the symbols of the Passion—the Cross, the Agnus Dei, the Scourge, the three Nails, the Crown of Thorns, and the Sponge and Spear; the foot ornamented to correspond with the body, with six medallions, containing the sacred monogram, the Chi-Rho, the open scroll, the pelican, the arms of the cathedral, and the crest of the donor") and the chalices are handsome and appropriate: the art a little weak, but the manufacture very good.

By far the most important production is Mr. Butterworth's Alms-dish, which is 2 ft. 3 in. in diameter. The centre subject is after Raffaelle's cartoon, St. Paul preaching at Athens, chased in high relief; the border being after a guilloche in the chancel of the cathedral, with medallions containing scenes in the life of St. Paul:—1. St. Paul healed by Ananias. 2. St. Paul healing a cripple. 3. St. Paul raising Eutychus. 4. St. Paul before Agrippa. 5. St. Paul at Melita; and the arms of the donor. The work is *repoussé*. The least satisfactory parts of the central subject, are the head of Paul, and the circular temple in the background. The right-hand side of the latter is so messed by the modeller, that it ought certainly to be altered before this otherwise fine dish be transmitted to its destination.*

NOTTINGHAM SCHOOL OF ART.

THE annual distribution of prizes in connexion with this school has taken place in the Exchange Hall. The Mayor (Mr. W. G. Ward) presided, and there was a large attendance.

A letter from Mr. Cole, of the Science and Art Department, who was to have presided himself, was read, in which

"he congratulated the town of Nottingham on possessing one of the very best Schools of Art in the country; and also said:—The town must adopt further measures for maintaining this position and extending the influence and advantages of further art-education, by the establishment of a Museum of Science and Art especially illustrative of those industries which have given Nottingham the eminent position it holds among the great manufacturing centres of the United Kingdom. . . . The School of Art already possesses suitable space for the commencement of such a museum. . . . The municipal authorities must incur the liability for the cost of watching, cleaning, and lighting the museum; and if this be done, Nottingham, within a few weeks from this time, might have a South Kensington Museum in its town, open daily, and for three evenings a week for the instruction and ennobling recreation of all classes. I say 'liability,' because the fees for admission on three days in the week would certainly yield some revenue. This revenue might be made adequate for all purposes without, perhaps, drawing upon the rates, if the gentry and the manufacturers of the town would take a sufficient number of annual tickets of admission for the students' day, say at 15*s.* and 10*s.*"

The mayor, in reading this part of the Report, said he could not sit down without bearing his testimony to the able services rendered by their excellent head master, Mr. Rawle. From the Report, it appeared that,—

"In the annual Government examination, held last May, the Nottingham school again headed the list, making the fourth consecutive year that Nottingham has gained the highest number of prizes among all provincial schools. In May last, however, the school took a much higher place, having not only beaten all provincial schools, but all the London schools, taking two more prizes than were taken at the National Art Training Schools, South Kensington Museum. In the prize bonus awards to art-masters this year Nottingham has taken the highest prize among all provincial schools. The first two prizes were taken by London schools; then the next eight were in the following order:—Nottingham, Manchester, Edinburgh, West London, Birmingham, Salisbury, Sheffield, and Glasgow. During the four years that bonuses have been given to head masters, it will show how evenly Nottingham had done its work when they found that in that time the master of the Nottingham school had taken 170*l.* in prizes, or 20*l.* more than any other school in the kingdom, including the London schools."

Mr. Bowler and the head-master also addressed the meeting. The latter said:—

"It has ever been a source of regret to me that employers of labour and artizans generally do not feel more alive to the necessity and importance of a more widely-spread art-education. The race for pre-eminence between certain nationalities is now a very close one, and if we do not brace ourselves up for the contest, we shall perhaps, by-and-by, find that the laurels of success have been won by others. We are now enjoying unparalleled prosperity, and yet, as a nation, we are doing far less for art than our position and means would justly entitle us to do. True, the country has one thing to be proud of, and that is the existence of that palace of art-treasures, the South Kensington Museum; and for the possession of which we are so deeply indebted to Mr. Cole, for it is in a very great measure owing to his efforts that the museum holds the proud position which it does. But we need more than that; the country should aid the action of the Science and Art Department still further, and not only give ungrudgingly all that is necessary for the completion of that museum, but also give with a bounteous hand for the purpose of erecting a young South Kensington Museum in each of our great provincial towns, that the seeds of art and refinement might be sown in many a soil now comparatively barren."

TRAVELLING IN RUSSIA.

COL. RICHARDSON GARDINER, whose handsome offer in respect of the one-day-to-be-raised-statue of Shakspeare we had occasion to mention some time ago, has sent us notes of a journey recently made by him to the Russian capital, which will doubless interest some of our readers:—

"At eleven p.m. we took our places from Berlin to St. Petersburg,—two nights' and two days' travel. Let us look about us and see what our arrangements are. L. and I have a double compartment-carriage, each opening out into the other by a door between; the one making up into beds for the night, and the other forming our compartment for day, all heated most genially by hot-water pipes laid on from the engine boiler. Good. Our commissionnaire, whom we sent to engage this extra comfort for us, carried out his instructions well. Our companions have a large saloon carriage, heated by a wood-burning stove, and all of them are seated round it smoking their cigars.

Now, I have no doubt hundreds of English railway directors have travelled on these German lines, and if they are not deprived of the means of observation they must have noticed many little things,—small in their way,—but calculated to be of great service and convenience to railway travellers, which they might have very easily introduced on their own railways. *Here's one:*—In this North Prussian carriage there is a pasteboard card, about 1 ft. square, headed 'Fahrplenmässige" (travelling plan regulations), and underneath, 'Aufenthaltszeiten' (stopping times), and it proceeds to give you, for the train you are in, its time of arrival at the stations, time of departure, difference carried out in another column as stopping time, and all times between six p.m. and six a.m., have a blue shade painted across them, leaving them quite legible, but not ended to show you that those are night times, without adding the p.m. or a.m., which sometimes carried through two or three days and nights, confuses you. It is well known that the Jews begin their day at six a.m., and their night at six p.m., each lasting twelve hours. The recurrence to this old mode of dividing the day and night, and the darkening of the hours indicating the latter, is a great improvement on our railway time-tables. On *another* side you are informed where there is to be a *table d'hôte*, and other species of refreshment, what are the 'Schlafvorrichlungen,' or sleeping arrangements in the carriages, and the 'Zollabfertigung,' or revision of luggage in the custom-houses, besides other information valuable to the traveller on the line.

Here we are at Dirschou, a town in ancient Poland, and crossing the frozen Vistula, a river familiar to my school days, and now we are going over its magnificent bridge, half a mile long, leaving Dantzig on our left, where the deals come from; and now we look out for Marienburg, and its Palace of the Ancient Grand Masters of the Teutonic Order, who nearly had their own house about their ears on one occasion when they were besieged in it. The *Meisters Remter*, or chapter-house of the order, in which assemblies of the order were held and foreign ambassadors received, for they were great Swells in those times, rests on a *single* pillar of granite in the centre. The Poles, while besieging the city in 1410, endeavoured to aim a cannon ball so as to shoot away this pillar, and overwhelm at one blow beneath the ruins, the Grand Master and all his Knights, whom they knew from information of a deserter, to be at the time assembled in conclave. *The ball missed its aim, but lodged in a corner of the chimney, where it still remains.*

Königsberg, once the capital of Prussia-proper, and *now* third city in the Prussian dominions. There in the *Schlosskirche*, Frederick, Elector of Brandenburg, in 1701, placed the Crown on his own head, assuming the title of Frederick I., King of Prussia, just as the present King William of Prussia, and now Emperor of Germany, is reported to have done when he came to the Throne, and coronetted himself by the Divine will, following the example of his ancestor. I am informed there is a considerable quantity of amber found all along the coast near Königsberg, and this is how they get it. The high winds throw up a vast accumulation of sea weed. The amber-fishers go up to their necks, provided with nets, by which they draw the weeds to land. The amber occurs in the lower beds of the sea sand extending under the Baltic, and when the storms bear up the amber earth, the amber is carried to the surface.

My observation (limited, certainly, but, as far as it goes, trustworthy) is that the Russians are beginning to be jealous of the Prussians and their late doings, as the Prussians seem to be giving themselves 'airs' everywhere, which creates an antagonistic feeling in the persons 'aired,' and is not calculated to inspire them with a peaceful feeling towards their 'airers'; —so do not let us be so sure that the French people and the French press are insane in imagining that some day or other the Russians and French may become allies; but here is the *bonâ-fide* frontier at last, and we stop out on Russian soil at Wierzbolow. Bravo, you Russian Tartars! I like the look of you! 'Good buffet, and plenty of time for refreshment!' 'Change carriages; passports and luggage examined.' All right; we have only nine large portmanteaus and boxes in the van, and twelve little parcels in the carriage, which have altogether cost to St. Petersburg a mere trifle of 18*l.* or so in excess of the allowance. I would not be so mean as to say that L. has had anything to do with this *limited* 'baggage'; however, business first and pleasure afterwards, so we at once go about our luggage. Before I go into that buffet, I will perform my first duty towards the Russians, by suggesting to any English custom-house officer, that *here*, in what our true-born Briton might call an outlandish place, he would learn a good lesson as to how his duty ought to be performed. First of all, everything in Russia is colossal and yet convenient, and we find that in a spacious *douane*, surrounded by a circular counter, numbered in divisions, without any hurry, bustle, or confusion, all our luggage is taken by the porters to a certain definite place, corresponding in duplicate to our numbered register-ticket; there the van luggage is deposited, and to the same place all the small parcels find their way; the officer on duty specifies to his *douaniers* what his requirements are, and, finding that we are a party of British subjects travelling for pleasure and not for trade, he deals most gently with our wardrobes, barely regarding even some new ball-dresses, which L. had had separately packed by the milliner, fresh from her establishment, in large deal boxes.

In to the 'refreshmenting department,' as poor Charles Dickens called it, and found there yet another example for our English 'Mugby Junction.' Half a dozen hot viands to choose from, accompanied by soup, coffee, or wine, and all of the best quality and description, served at a moment's notice, on table-cloths white as snow, with most attentive and respectful waiters; add

* Since this was written, we have been informed by Messrs. Lias that, recognising the correctness of the objection we took on examining the work, the parts in question will be altered,—a determination very creditable to them.

to this lavatories, with the requisite accompaniments of soap, towels, &c., and I leave you to judge of what has been talked about as barbarous Russia. Here we are, on our first introduction at a frontier station, finding more civilisation than has happened to my lot in many an old country through which I have travelled.

Wierzbolow, I find, is 560 miles from the capital, where we shall arrive to-morrow evening: so we are beginning to be near the end. And now time is up, and we must get ourselves into Russian railway quarters for the first time. Now let me next make a survey of a first-class railway carriage: here it is before me, and it appears to be something entirely novel. It has two ends and a middle. Well, so have most things; but how are they arranged? At each end there is a compartment for, say, five sitters, but comfortably containing only three passengers, and the middle has four small square compartments (two on each side of the centre passage), large enough for one comfortably to curl up and sleep in, although evidently intended for more. Well, now outside, just in advance of the end compartments, there are doors by which you enter a cross passage, leading to a centre passage, which leads to your respective departments, so that by taking for L., her maid, and myself, one end compartment, and the others taking unto themselves the four centre small compartments, we leave the other end for stray passengers on the way, or others getting in at Wierzbolow. There are two stoves, one of which is fixed in the interior division of each of the end departments, so that half the stove is in the carriage, and the other half in the cross passage, and as the temperature was about 70° Fahr. on entering, we began to think we should not, at all events, suffer from cold on our journey.

If you can follow this plan you will perceive that our party were all, as it were, together under one roof, and that we could pay each other visits in our respective cabins, as our lumbering, old, rolling, but still comfortable carriage, put me much in mind of a steamer of the olden time; and its wheels, as they rolled over the frozen rails, sounded just like the paddles beating against the waves.

We strongly objected to be stifled with heat in Russia, where we had expected to have met our fate by frost, and I addressed myself to the 'storekeeper,' who accompanies every first-class carriage, to reduce it by machinery which they have for that purpose: so I 'unearthed' our Russian fireman from a corner of the cross-passage, in which he had doubled himself up for a nap; and now began a series of amusing signs and symbols, which continued, with varied intermission, between this interesting old man and myself during the next twenty-four hours of our journey. He was a character in his way, and seemed to be a Russian originally from the far interior of Siberia, of the Tartar race,—brawny and muscular, with high cheek-bones, small bright eyes, terribly shaggy hair, and a face as broad as it was long,—a complete parallelogram. We soon got friends after arranging the stove.

550 miles from St. Petersburg, at 'Kowno,' where, on the 22nd June, 1812, the French army crossed the Niemen on their advance to Moscow, and some rising ground on the opposite bank is still called Napoleon's hill. The town of Kowno was occupied by a large *corps d'armée*, and suffered considerably. The remnants of the army recrossed the river at the same spot on the 13th December, in a very bad state of discipline. There is a monument existing commemorating this retreat, and bearing the following inscription in Russian, which, translated, is as follows:—'In 1812 Russia was invaded by an army numbering 700,000 men. The army recrossed the frontier numbering 70,000!'

441 miles from St. Petersburg, at 'Wilna,' occupied by the French on the 28th of June, 1812. It had been evacuated by the Russians during the night. The Emperor Napoleon occupied in the Episcopal Palace the rooms which the Emperor Alexander had left the previous day. The country all along here is covered with snow, so I cannot form an idea as to its cultivation; but the villages are few and far between, and those do not exhibit any high degree of prosperity. They are mostly composed of wood, somewhat resembling, only in a poorer degree, the Swiss mountain chalets. Birds are scarce, not liking, probably, to face the deep snow. We have only seen two magpies for miles; but as the old couplet says, one magpie is sorrow, two mirth, three a wedding, and four a birth.

Between stations separated by long distances, we amuse ourselves with the contents of the picnic-basket, and having Liebig's essence and Fortnum & Mason's compressed beef tea, with other delicacies, our Etna boils up some water, and we get a capital entertainment in the Swiss Family Robinson style. Our cabins are now kept by our old friend at a delicious temperature; but when we issue forth at a station, we all don our complete suits of furs, as the air is nipping cold, but full of oxygen and ozone, as the country is overlaid for hundreds, and even thousands, of miles with its wintry covering of snow, and we are warned by a notice not to put our heads out of the little window of our cabin, which is only 1 ft. square, as '*Cette imprudence pouvait avoir des consequénces graves.*' But with our shubas, caps, boots, and gloves, it would be impossible even to feel a shiver with many more degrees of frost than we have had yet.

We get most delicious coffee at the buffets, and still more delicious tea, served in tumblers for the gentlemen, and cups for the ladies, with milk that the Russians are not yet sufficiently civilised to adulterate with unwholesome materials; and notice is given you of the starting of the train by three bells first pealing outside the station, and repeated by an official at the refreshment-room door, rung successively at intervals of a few minutes,—the first, a notice; the second, a warning; and the third, we're off. All along the line the men live in wood huts, which are all numbered outside with white paint, starting from the capital, so you can count off your approximation to the end of your journey as you get along. And now the numbers are gradually diminishing, until, at length, St. Petersburg bursts upon our view, with its colossal public buildings, its gorgeous palaces, churches with gilded cupolas, and sleighs with fast-trotting horses are awaiting us, into which we get with alacrity, leaving our luggage to the commissionnaire of the hotel to bring after us, and drive off at the rate of twelve miles an hour over the frozen snow to the Hôtel de Russie, where we find, as we ordered by telegram, warm baths, comfortably-heated rooms, a dinner *à la Russie*, all awaiting our kind attention."

HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET, BLOOMSBURY.

THE Hospital for Sick Children, now about to be rebuilt, from the designs of Mr. Edward M. Barry, R.A., occupies a site of historic interest, and is peculiarly appropriate for a medical charity. The old house was the dwelling of Dr. Meade, the courtly Court physician, the Mæcenas of the men of letters of his day, and that of Addison, himself a wit, as well as a doctor of great repute, whose name, however, lives in Sir C. Hanbury Williams's line,—

"Health waits on Meade's prescriptions still,"

as much as, or perhaps more, than in his medical works, now seldom read, although well worth the reading.

The house had a spacious garden twenty years ago, well furnished with shrubs and fruit-trees. The vines bore grapes, and the large hothouse was still standing when the new era in the history of the place began. The marble-flagged dairy exists still. The stables opened to the fields, and less than 100 years ago the horseman could mount and ride through green lanes all the way to Highgate, whose village steeple still forms the most striking object seen from the upper windows.

Bit by bit the old house has put on a soberer dress as it has longer served its present purpose. The gilded cornices have been distempered, the pictured panels of flowers and shepherdesses have been exchanged for a modest grey; but yet an incongruity has been unavoidable between the style of the building and its uses; for it has not grown fitter for its present purpose in the same proportion as it has lost its old quaint beauty. Deep cornices collect dust; wooden and painted walls are difficult to clean; warming and ventilation are hard to carry out properly; and, worse than all, a life of 170 years tells upon houses just as the customary three score years and ten do upon man. And so, with ever-increasing demands from the poor, which are not nearly met by the increase of beds from twelve to seventy-five, and with the constant need of yearly repairs, to keep the old hospital even habitable, the committee have determined to rebuild by degrees, as means are afforded them by the generosity of the public.

That which it is now proposed to build is the central block, which will contain most of the offices, the dispensary, operating theatre, chapel, and arrangements for the extensive out-patient department, on the basement-floor; and this plan has the great advantage of leaving the existing buildings almost completely undisturbed, and so of allowing the internal working of the hospital to go on without interruption.

Had the site been a larger one, the arrangement would in many respects have been different, and the problem to be solved by the architect much easier.

Before describing the details of the building, a few peculiarities may be mentioned as required in a children's hospital, which would be less necessary in a hospital for adults.

First. The out-patient accommodation needs to be more extensive and more complete in a hospital for children, because each patient requires a grown person to take charge of him, which, even if two or three should be brought by the same adult, the increased risk of confusion more than makes up for the saving in space occupied. Hence the need for special arrangements to prevent crowding, and to avoid the meeting of a double current of patients.

Secondly. Considering the liability of children to some forms of contagious illness, it becomes necessary to provide a separate waiting-room for patients on their first application, in order that as they come they may be immediately inspected by one of the medical officers, and thus will contagious ailments be separated from the others, who will be at once sent to one or other of the two large waiting-rooms, according to the physician or surgeon under whose care they are to be placed.

Thirdly. In connexion with the wards themselves, in addition to the bath-room and water-closets which are needed in all hospitals alike, it is very important to provide a ward-kitchen, where milk, beef-tea, and the various little articles of food so much needed for children can be kept in readiness day and night without the necessity of sending to the kitchen. It is also necessary to provide a vestiary in connexion with each ward, in which not only the ward linen, but also the children's own clothes can be kept, so as to secure perfect neatness and order.

It will be observed that there are no nurses' rooms in communication with the wards, because in children's wards nurses when present are always on duty; while they take their meals in a common room, and sleep away from the wards. The allowance of cubic space to each patient in the wards is in no case less than 1,000 ft.

The small separate wards speak for themselves, as being needed for special cases, while the quarantine ward at one end of the north wing is intended for the reception of cases of doubtful illness until the question of their nature is answered, when they will either be removed to the adjacent but detached fever ward not yet erected, or be restored to the general wards of the hospital.

The centre portion of the building in Powis-place is now in progress.

The out-patients' baths, the special arrangements for convalescents, and many obvious wants, are intended to be supplied, as shown in the plan, as soon as funds enable the committee to pull down and rebuild the two houses, 48 and 49, Great Ormond-street, which, as already said, are left for the present untouched.

Mr. John Walter, M.P., always ready for a good work, has consented to preside at a dinner in aid of the funds of this Institution, on the 7th of next month, and will, we hope, be well supported in his appeal for help.

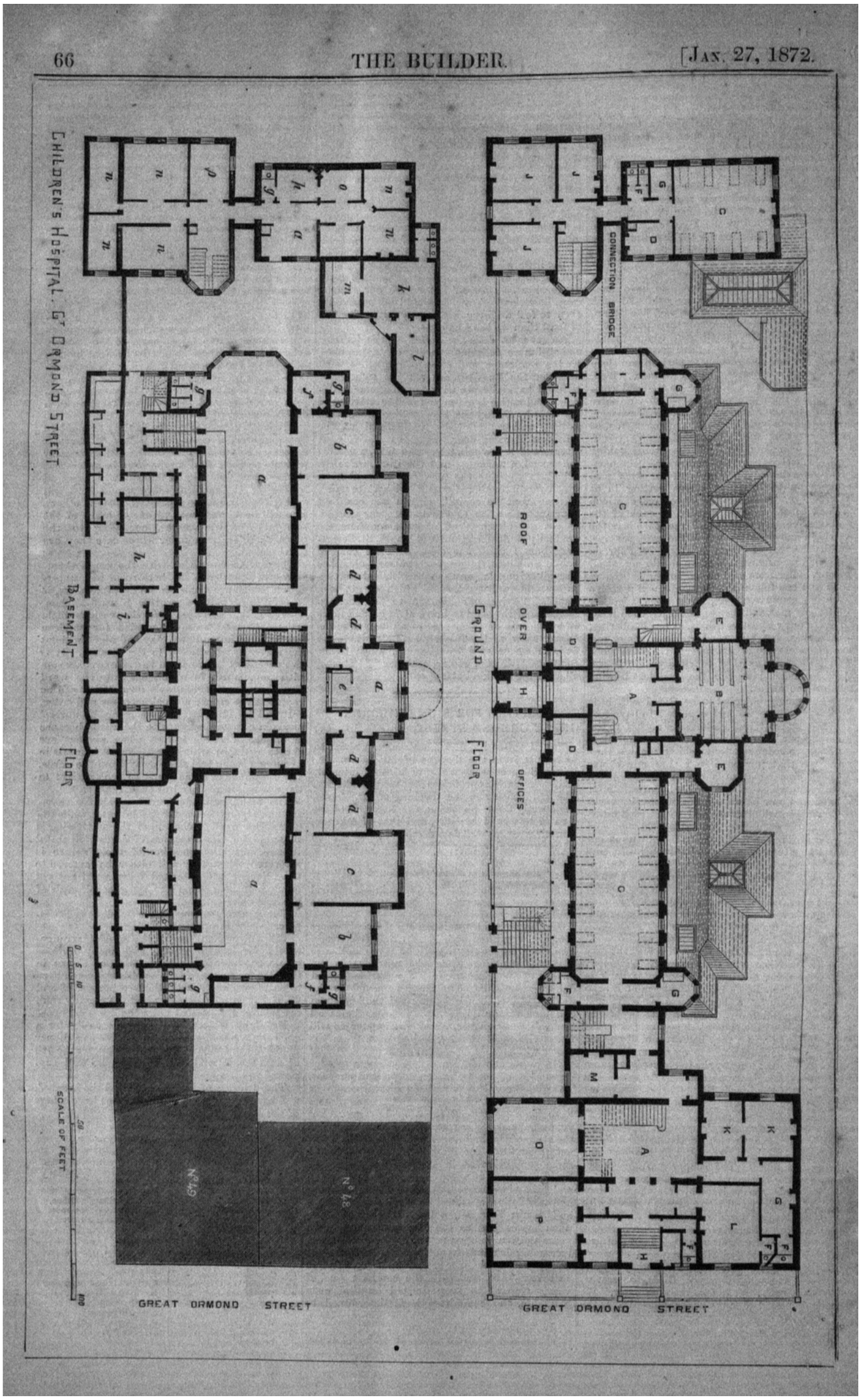
The Princess of Wales has visited the hospital, and has sent presents of toys, &c., as have others of the Royal Princesses.

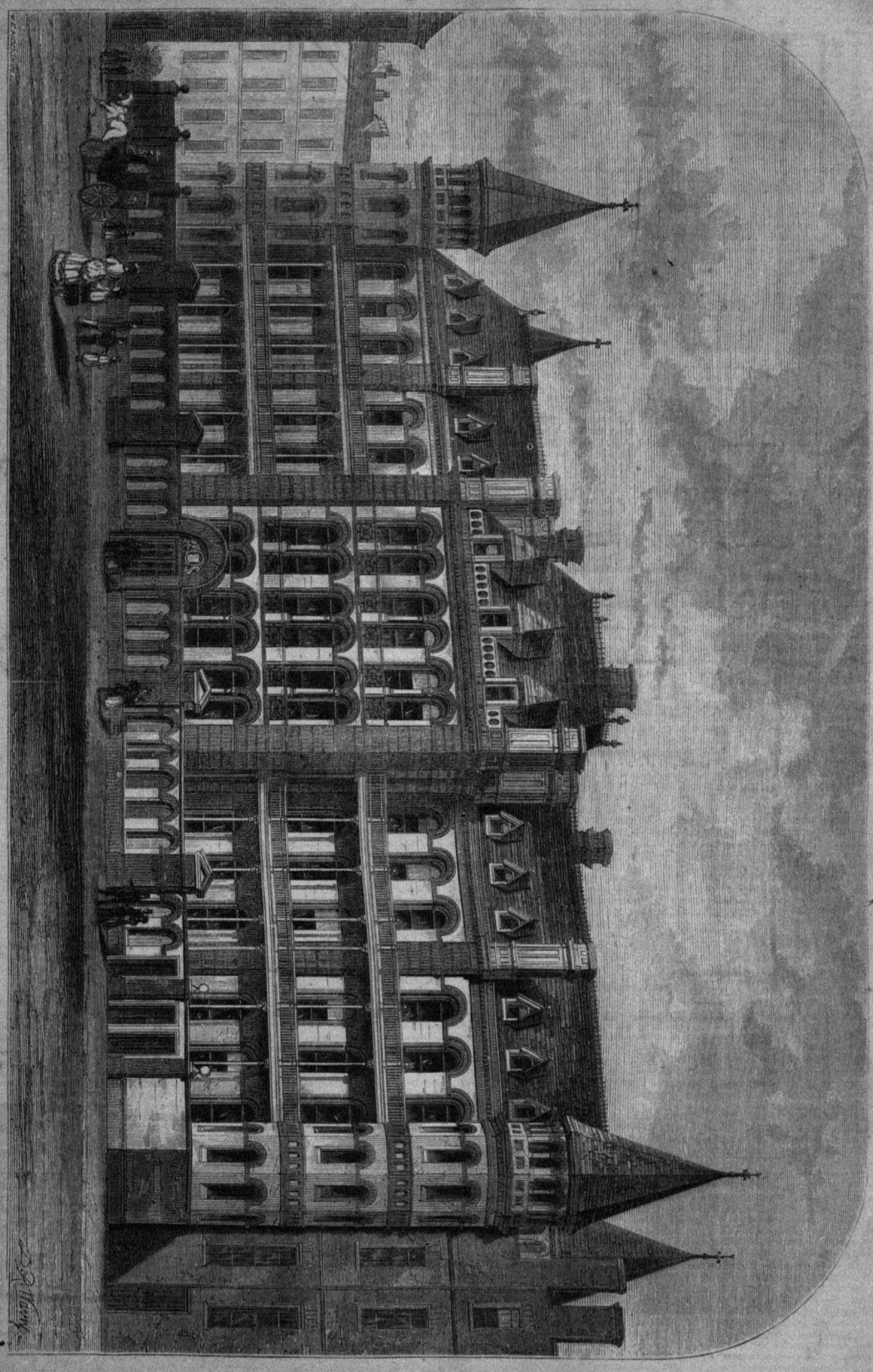
REFERENCE TO GROUND FLOOR.

A.A. Hall and Stairs.
B. Chapel.
C.C. Wards.
D.D. Ward Kitchens.
E.E. Vestiaries.
F.F. W.C.s.
G.G. Bath-rooms.
H. Porch.
I. Nurse's Room.
J.J. Separate Wards.
K. Lady Superintendent.
L. Ladies' Common Room.
M. Housekeeper's Office.
N. Secretary's Office.
O. Nurses' Day-room.
P. Committee-room.

BASEMENT FLOOR.

a.a. Out Patients' Waiting Hall.
b.b. Consulting-room.
c.c. Second Waiting-room.
d.d. Dispensaries.
e. Stores.
f.f. Medical Officer.
g.g. W.C.s.
h. Kitchen.
i. Scullery.
j. New Patients' Waiting Room.
k. Post-mortem.
l. Study and Museum.
m. Dead House.
n.n. Servants.
o. Dispensary.
p. Medical Officer.
q. Lobby.


Children's Hospital, Gt Ormond Street
Basement Floor
Ground Floor
Roof over Offices
Connection Bridge
Great Ormond Street
Great Ormond Street
No 49
No 48
Scale of Feet



THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET, BLOOMSBURY.—MR. EDWARD M. BARRY, R.A., ARCHITECT.

BUILDING ON THE PEABODY ESTATE AT BRIXTON.

BUILDING on a large scale is now going forward on the Peabody estate, at Shepherd's-lane, Brixton. This estate, comprising sixteen acres of land, which was purchased, some seven years ago, by the late Mr. Peabody himself, in connexion with his philanthropic intentions of erecting dwellings for the working classes, has for some time remained a waste, but recently the trustees, instead of building upon it themselves, have commenced letting it on ground-rents, and dwellings of a class somewhat above those known as for the poor are being erected in large numbers, according to plans and conditions laid down by the trustees. Several streets have been laid out, and we understand that the entire number of houses on the estate will shortly be about 500, being equal to a population of something like 3,000. It is stated that the trustees have decided to spend the large income which these ground-rents will produce in erecting, from time to time, blocks of houses in different parts of the metropolis, similar to those in Blackfriars-road.

MR. EDWARD WALTERS, ARCHITECT.

WE hear with regret that Mr. Edward Walters, of Manchester, died on the 22nd inst., at Brighton, after a few days' illness. He was architect of the Free Trade Hall, Manchester, and had a very extensive business, chiefly in the building of warehouses, many of which, as we have before had occasion to say, are of considerable merit. Mr. Walters had retired from the active pursuit of his profession for the last few years, but his business is still carried on by some of his former pupils. We shall give particulars of his career on another occasion.

NEW METROPOLITAN RAILWAYS, TRAMWAYS, AND MISCELLANEOUS IMPROVEMENTS.*

FROM year to year the number of permanent lines of railways, and in recent years of tramways, sanctioned, or actually opened, in the metropolitan district, increase in the aggregate mileage; but many of the proposed improvements shown in parti-colours, one year after another, disappear in succession, or the map of proposed improvements published annually by Mr Stanford would become so thickly lined as to be illegible. In recent years a notable change has occurred in some of the principal features of the publication. The lines of colour that ran athwart the map in various directions related almost exclusively to railways, with portions of colour in one place and another indicating miscellaneous improvements. This year the tramway lines opened, sanctioned, and proposed, are distinctively indicated in blue colour, and, in the aggregate preponderate greatly over the proposed railways. The most obtrusive indications in red colour in this year's map relate to street and other improvements, chiefly public thoroughfares and markets, and are proposed by the Metropolitan Board of Works.

The most important new railway proposed, as shown in the map, is the Mid-London, of nearly nine miles in length, traversing London between east and west. For this important scheme the large amount required by standing orders to be deposited, has been, we learn, duly lodged. The other new railways proposed, include a London & North-Western extension from West Ham to the Victoria Docks; alterations in the South-Eastern direct line between Greenwich and Woolwich, including a diversion of the southern outfall main sewer at Greenwich; also a connecting curve between the South-Eastern and the London, Chatham, and Dover lines at Blackfriars; a junction between the Waterloo Station of the South-Western and the Blackfriars Station of the Chatham and Dover; with a few other projects, some of which are not likely to be further heard of, more than one of them being already, indeed, defunct. The plans for new railways, as lodged Nov. 30, embrace twenty-nine branches, and about thirty-nine miles of new lines.

The metropolitan tramways that will come under the consideration of Parliament embrace 185 branches and 116 miles of line. Three of the projects are to be proceeded with by Bill. These are the Exhibition subway; London, Streatham, and Croydon; and the London Street Extensions; &c.; including the Oxford-street route, and eighteen miles of street tramway, in all. The London and Croydon Bill is for 9½ miles of line. One new provisional order tramway scheme is indicated for six branches and nearly two miles of new lines. Three Tramway Bills, which were suspended by order of the House of Commons, July 13th last, will be revived. They are for 57 branches and 22 miles of tramway. The consideration will also be resumed of eight other tramway projects that came under the Provisional Orders Suspension Act, 1871. They are for 86 branch tramways and 65 miles of line. The tramways of the longest mileage are, to Watford, by the Common Road Conveyance Company; to Croydon; to Southam, Ealing, and Shepherd's Bush: to Kensal Green, and to Fulham. The North Metropolitan Company has received Parliamentary sanction for the laying of many miles of tramway, as shown by the map, that are not yet constructed.

The miscellaneous improvements include, amongst others, the Admiralty and War Office rebuilding; Brighton and London sea-water supply; Holborn Valley and Farringdon Market improvement; Leicester-square Market and improvement; Newport Market and approaches; New Mint building site; metropolitan street improvements; Serle's-court and Cook-street improvements; and the Temple Subway.

The map is one of the most interesting that has appeared.

* New Maps [of Plans, &c.] deposited in the Private Bill Office, November 30th, 1871, for Session 1872. London: Edward Stanford, Charing-cross.

ABOUT A NEW STYLE.

SIR,—The cry for a "new style" is so loud and continuous that it cannot be passed by without notice, and hence we find that almost as often as the cry is raised has the attempt been made to satisfy it. How far successful, the greater part of your readers know. Now, although I am going to lay a plan down for this nineteenth-century English want,—we do not find it abroad,—I must say that the cry and the response are equally the offspring of ignorance of all history, as well as ignorance of and feeling for art. As well may the Bosjesmen be able to spring at once into a high state of cultivation without the necessity of passing through those intermediate stages, as much required by a reasonable being before being convinced, as by the necessity for the convincing example of others more civilised than himself, as that a new style can at once be invented possessing all those æsthetical qualities required by the true canons of art, without the blast of ages and the refining influences of many workers.

In this age of iron and glass it has been suggested that those materials should form the foundation of an original architecture. To some extent they will, but iron for art is a terribly hard substance, and glass is a brittle one. The former for the purposes of art is little superior to the latter. Architecture, to be worthy of the name, should be unornamental, should last for ages, should upon every portion bear the mind of the different artists employed, should be fashioned by the hand of the cunning workman in stone, embellished by the sculptor, and glorified by the colourist. Iron and glass will never fulfil the conditions required by art, nor can wood, since it is too easily destroyed for any great art-work to be devoted to it. This more especially as regards edifices. Wood-carving, we know, was raised to a high pitch by our old Mediæval workers, and in modern times by Grinling Gibbons; but much of the former has been devoured by time and destroyed by man, whilst the edifices which once contained much are now empty.

Stone presents more favourable conditions than anything else in building materials for the architect. Terra-cotta, and all burnt earths, whether called bricks or any other name, since their production entails mechanical processes, and these mechanical processes imply or determine repetition of parts or wholes, should never be used for monumental purposes, except for solid unadorned surfaces. A reason can easily be given. The designer produces a portion of the building in clay or stone; it is reproduced in terra-cotta; it may be ten, it may be a hundred,—ay, ten thousand times; and every time that such art work is produced more than once it loses value, as surely as a painting, if it could be reproduced as many times, would. It might be said, "Yes, it is none the less a work of art. You cannot make a thing less beautiful by repetition." I say you can. If every beautiful woman were similar, and all women were beautiful, then would the eye see no beauty, but long for a change. The mind and the eye must be equally impressed, must teach art in concert, either for pleasure or pain. Thus, I argue, our new style of architecture must be a creation in stone, and that no new style can be revealed upon the spurt of the moment, but must be the work of ages; and yet I come and say, "Here is a new style; behold the clamouring hath its want, the agitator his will." Certainly "with reservations." Before producing this wonderful child, maybe I may ask the number of styles now extant. Shall we start with Syrian, or Egyptian? Shall we follow them with Grecian? and shall we divide Grecian into three, and then deny that the Romans had any architecture at all? If we do, our premises are narrowed considerably, and the more we try to work upon them the more they contract, until we find ourselves back in some remote age when the upright post and horizontal lintel are magnified to such an extent as to dwarf all after productions; but, not to be beaten, we start again. We argue there are only three roots, if I may so say, which have produced all ramifications, the greater of the ramifications being called styles. The three roots are the post and lintel, or horizontal root; the semicircular arch root; and the pointed arch root, each root nevertheless primarily shooting from the same plant.

Now, these roots and ramifications being admitted as necessary, if we admit that Greek art owed its origin to some previous growth, then the previous growth of Roman being Greek, Roman art has as much right to be classed as a style as Greek art, especially as the arch became an important feature. All styles are not, of course, equally distinct or well marked; in fact, the growth from the Roman for centuries was both laboured and slow. Scarcely do those phases popularly called Romanesque or Byzantine deserve the name of style. They really bear the same relation to Roman or Greek art which our Tudor or later Gothic, rightly termed debased, bears to the First, Second, or Third Pointed, with this difference,—the Romanesque led to one of the healthiest roots, or branches, if you will—the Pointed style,—our Norman being a description of Romanesque. The Tudor ends with rottenness and death. It has led to no art, and at the present time it seems that it never will. Taking real architectural art as commencing with the Grecian, tracing it through Roman, Byzantine, Norman, and the Pointed, we find many off-shoots almost as strong as the main trunk. Arabesque deserves a place to itself, as being a mixture of Romanesque and Hindoo; but, for the sake of my present argument, I had better not touch upon Hindoo art as China, with her early origin, would certainly claim precedence and continuing influence, as it is not unlikely that, although she kept so exclusively to herself, some wanderers had seen her architecture, and bore the knowledge of it westward.

We can now pretty well ascertain the number of admitted styles. We can see that one style was the off-shoot or continuance of a former, or many former styles. That, in fact, Roman art proper was a simple continuance of Greek. I do not mean Roman temples, for they were simply transplants, but their civil buildings: and here I will instance the Coliseum, and deduce from its treatment the production of a style—the Italian style. The manner in which this style was moulded and fashioned is both curious and instructive. An age of magnificence had arisen in the history of Rome, when the people had to be considered as well as the warriors and priests. Places of amusement had to be provided for vast numbers, and architecture seemed wanting, for several reasons. Had Doric, Ionic, or Corinthian buildings been erected as heretofore, no known material could have been obtained sufficiently large to span intercolumniations in such numbers as were required. Truly, blocks of granite might have been found, but the time and expense in the quarrying, in the carriage, and in the erection of such monoliths, would have entailed a never-ending task. A building had, therefore, to be provided containing the increased space without necessarily increasing the size of the materials employed. Knowing as we now do the course pursued, we can hardly appreciate the difficulties to be overcome, or the success and applause which followed the achievement. The employment of one order in height having been found impracticable, the dodge or alternative was to use two orders. Common sense as well as mathematical and practical

knowledge, without much reference to art, would at once dictate the position of the orders; the strong to support the weak, the heavy below the light, the elegant and slender above the severe and robust.

My argument, therefore, is this: the Romans, who were certainly a wise people in their generation, did not rave about, did not attempt to produce, an entirely new style, however much they, as conquerors of the known world, might have deemed it incumbent to produce one; but sensibly took up a style which they found, and modified it in the manner before hinted at, taking the Greek orders almost as they found them, and clapping one upon another.

This, with the introduction of the round arch, led eventually to our own Mediæval orders—Norman, Early English, and Geometrical,—which mutually I will term chords of Doric, Ionic, and Corinthian, in the Greek. Perpendicular may be sympathetic with the Roman composite,—I mean no parallel. Why, therefore, should we not copy the Romans in this instance, as we seem to be doing in others? and, having already to our hand Norman, Early English, and Edwardian, treat them as the great colonisers treated the Greek,—using the first, second, and third as ingredients in the same building? The Norman heavy, stable, and bold for the main support; the Early English as lighter, less heavy, and more pliable above it; and Edwardian as richer, more elegant, and more varied above that. The best phases of Perpendicular (I cannot say Henryddian,* being no Welshman), in case of a very lofty building, might be pressed into the service. With the three or four phases of Gothic used in the same building,—the eternal sameness which so palls upon the taste in all our modern Gothic secular buildings, would be got rid of. The terrible nightmarish striving-after-novelty-change-any-thing-for-variety-sake would be less needed; and these old breeds being all grafted together upon one stem, would not unlikely bear a description of architectural plum before unknown, which would satisfy the craving for a new style, now amounting to a disease, which possesses seven-eighths of the community.

I am not joking, sir. I know that much of the beauty of our old Ecclesiastical edifices results from the juxtaposition of the different phases of Gothic art. There is one noble building which disappoints me the more I examine it, and I think the absence of this interweaving of styles is the cause. I mean Salisbury Cathedral. Admitting its splendid proportions, the harmony and beauty of its grouping, as seen from the east on a moonlight night, upon examination there is a stringiness, a poverty, a weakness, solely attributable to the constant—and too constant—repetition. Examine the window above window in the transepts, one flight above another, which from the outside impress you as lighting different chambers, but from the inside utterly confuse you, and tell me if there is not some reason for my assertion.

In modern buildings of large dimensions, I may mention the Houses of Parliament, which have caused their designer and all connected with them infinite labour and pain from the use in their design of only one phase of Gothic,—twist it, repeat it, pile it up as you may. Enrich it—till, if worked, it should turn out one of the best gold-mines ever discovered—from the amount of ore thrown into it. Still is there a certain poverty, undiscoverable in one of our plainest old Gothic buildings with the exception of some few which have had the misfortune to be erected in one style. And so surely as the new Law Courts are put up will they also be a failure from the same cause.

The reason is this. We, as well as the Romans, indulge in monster buildings. Now these gigantic affairs are beyond the range either of Doric or Decorated; for consider, had the Romans, instead of using five orders in the Coliseum, used only one, what description of affair would it have turned out. Should they have employed but one order for the entire height, then behold the size of each column; should they have used Doric above Doric, then look ye at the maddening repetition. The Greek buildings were small and compact; one order thought out was sufficient, and then in some of their largest buildings I have no doubt the architects and builders had as much to do as they well knew how.

Why, then, should we not do as the Romans did,—cast from us the desire to achieve the impossible, by endeavouring to make either Roman, Early English, or Decorated do singly what a Greek order could not and cannot do; and take into our hands all our Gothic styles, and mould them into a whole as harmonious as any Italian building under the sun. I for one will, the first opportunity I have, try the effect of such a building, and I dare swear it will not be one of the most unsightly.

MARTIN UNDERWOOD.

* Pron. *Henrithian*.

WORCESTER GUILDHALL COMPETITION.

AT a special meeting of the Worcester Town Council, a Report from the Survey, Buildings, and Property Committee, on the state of the Guildhall, was read. It contained, among others, the following resolutions:—

"That it be recommended to the Council to authorise this committee to obtain plans for the reconstruction of the Guildhall, giving the requisite additional accommodation, and that architects preparing plans be requested to limit the expenditure to 9,000*l*."

"That, in the opinion of this Committee, the wings of the Guildhall are in such a bad state of repair that they must at some early date be entirely rebuilt; and that the committee, having regard to this, be authorised to obtain (in addition to the plans recommended by the foregoing resolution) plans for the entire rebuilding of the Guildhall and wings and offices, at a total expenditure not exceeding 18,000*l*., in order that the Council and the citizens generally may be in a position to judge whether it would be better to reconstruct or entirely rebuild, and that it may be ascertained whether any large portion of the amount can be provided by voluntary contributions."

The report was received and adopted; and the Council also resolved that the competition be thrown open, instead of being limited to architects of the city and county of Worcester, or the city architect (Mr. Rowe), as proposed by amendments.

It was agreed that premiums of 60*l*. for the best and 30*l*. for the second best plan for the reconstruction be offered; and premiums of 100*l*. and 50*l*. for the best and second best, respectively, for rebuilding.

The committee were directed to prepare instructions for the architects, and lay the same before the Council.

THE DECISION IN THE WORCESTER SCHOOL BOARD SCHOOLS COMPETITION.

SIR,—With this I send a copy of a protest which has been lodged by me against the recent decision of the Worcester School Board, by which they placed Mr. E. A. Day, of Worcester, with motto "De Die," first; and myself, with motto, the arms, and "No Extras," second, in competition for their schools.

As the reception of drawings after advertised date is an unheard-of proceeding, which, if allowed to pass unchallenged, will operate most seriously against every member of the profession, I politely request every architect, whether a competitor or not, to at once write me to London address (135, Cheapside,) an endorsement of my protest, as I consider in acting as I am doing I do so as much in the interest of the profession generally as for my own benefit.

The next ordinary meeting of the Board takes place on Thursday, the 1st of February, and letters posted on Wednesday will reach me at *Worcester*.

As I consider the matter one of vital interest to us all, I trust you will find room for a copy of the protest. W. SECKHAM WITHERINGTON.

"January 19, 1872.

To G. W. Hastings, esq. chairman,
Worcester School Board.

PROTEST.

Sir,—Having received intimation that your Board have placed Mr. E. A. Day first in the school competition, and have awarded the premium of 30*l*. to myself, I beg respectfully to enter the following protest against Mr. Day's plans being carried out:—

1. The motto 'De Die' is a palpable play upon his own name.

2. That two or three days previously to the 30th, being extremely pressed for time, I sent to Mr. Marcus (the secretary), to say that, as the 31st (the day named in the advertisement for sending in the drawings) fell upon the Sunday, I should be glad to know when plans were to be delivered. The answer returned was, 'Plans must be delivered before the 31st.'

3. On Saturday, the 30th, I sent to the Guildhall, to know what was the *latest hour* for the delivery of the plans, and the answer was, 'Five o'clock to-day;' and although any extension of time would have been invaluable to me, my plans were deposited before that hour.

4. Though this information was given officially, of my own private knowledge I know that Mr. Day's plans were not delivered on Saturday; whilst I have positive proof that his drawings did not leave his office till after eight o'clock on Monday night, the 1st inst., at which hour, it would be only reasonable to suppose, the Guildhall offices were closed.

5. I need only say that the great principle of all competitions is a certain time of delivery for all, and I am confident that it will be only necessary to explain to you and to your committee these facts, of which you have, of course, been hitherto ignorant, to insure that justice shall be done to me, and Mr. Day's plans disqualified."

Mr. Henry Haddon, of Messrs. Haddon, Bros., Malvern and Hereford, whose design, "Idoneum," was third, endorses the foregoing protest.

*** If the circumstances be as stated, the impropriety of the proceedings is manifest. Such a course admits the possibility of a favoured competitor being enabled to see the designs of other competitors before completing his own. Beyond this, however, it can scarcely be doubted that the decision is illegal; it is a breach of contract. If the matter be properly brought to the notice of Mr. Hastings, we have no doubt it will be set right.

TECHNICAL EDUCATION.

THERE has been a general meeting at Sir Antonio Brady's chambers, of the gentlemen who have taken a prominent part in the movement having for its object the establishment of a national technical university, for the purpose of completing the arrangements to establish an association representing all the interests involved.

It was stated that Colonel Gourley, M.P., had offered 500*l*. towards the establishment of the university. The result of the debate was the passing of resolutions deciding that the name of the amalgamated organisation should be the National Technical University and Trades' Education Association; that Sir Antonio Brady be the chairman of the council, and Colonel Gourley, M.P., chairman of the executive; that Mr. Scott Russell and Mr. R. M. Latham act as vice-chairmen of the council; that Mr. Thomas Brassey continue to act as treasurer; and that the hon. secretaries should be Dr. Mill, representing the original Technical Education University Committee; Mr. Campin, representing the Inventors' Institute; and Mr. Paterson, representing the working men.

It was understood that these appointments were provisional. An executive committee was also elected.

CITY SEWERS STILL DRAINING INTO THE THAMES.

AT a recent meeting of the City Sewers Commission a report was received from Mr. Haywood, showing that no less than nine main sewers and nineteen smaller ones still drain into the Thames within the limits of the City; although in the last report of Mr. Bazalgette it was stated that there only remained certain portions of the lower outfall to be finished, and that the whole of the works were complete with the exception of a short piece at Blackfriars Bridge connected with the Fleet outlet.

Mr. Hora said that such a report as that just presented might well astonish the people of London, after spending 444,000*l*., and it should be borne in mind that there were something like twenty or thirty inundations every year.

The Chairman observed that this was one of the most important subjects that court had had before it for some time. As an evidence of this he read an extract from a report of a deputation from King's-cross and neighbourhood which waited upon the Metropolitan Board of Works on the 20th of last December. The extract had relation to the periodical inundation of the lower and basement premises.

MEETING OF BUILDERS.

A MEETING of master builders of the metropolis has been held during the past week, to consider the requisition of the Operative Stone Masons' Society to work uniformly all the year round 51 hours per week, and for a rise of wages from 8d. per hour to 9d. per hour from the 1st of July next. The proceedings have not been made public; but we understand that a unanimous opinion was expressed that 51 hours per week could not be agreed to, the engineers and other trades having just settled on 54 hours per week.

It was also generally agreed that it was an absurdity on the part of the masons to ask to work the same hours in summer as in winter, when dark days, frost, and bad weather interfere so very much with all building operations; and several masters expressed their opinion that no mason in their employ was able, under the present rule, to make an average of 54 hours per week all the year round.

It was also generally agreed that it would be almost an impossibility for masons to come and go at different hours to the bricklayers and other men on a building, and that to reduce all other trades down to 51 hours per week, in order to meet the demands of the masons, would be an act of injustice. The meeting was also of opinion that the present rate of 8d. per hour for an ordinary mechanic was a good rate of wages, and that the state of trade in London did not appear to warrant any increase. Ultimately it was determined to adjourn the meeting in order that some other builders not then present might be consulted before a decision was arrived at.

STAIRCASE AT THE LONDON TAVERN.

SIR,—Having just returned from the London Tavern, after two days' polling in behalf of candidates for admission into the London Orphan Asylum, I cannot but draw your attention to the state of the pieced stone staircase there. You did good service some years ago in drawing attention to mended stone staircases and cracked landings after the fatal calamity at the Polytechnic Institution. I am not an unnecessary alarmist, but most people who have visited the London Tavern on occasions such as I allude to know well how many persons spend the day on this staircase. The distress amongst widows and children, draped in black, on this staircase is always evident on these occasions, and there should be no possibility of a harrowing accident. I need not state that there is such a possibility, but I must say that any professional man visiting this staircase cannot but be struck with its apparent insecurity as the treads have been cased. Prevention is better than cure.

F.R.I.B.A.

DRAIN PIPES.

WILL you allow me to express an opinion upon the paragraph,—"Iron Pipes for House Drainage," page 43, of your last week's impression?—

No cleaner, cheaper, more durable, or better adapted article can be used for house drainage than socketed, glazed stoneware pipes, jointed in cement. If the joints are left imperfect, gross carelessness is denoted on the part of those superintending, which need not occur where due vigilance is exercised. Iron pipes are more costly, to begin with; they oxydize, become filthy, and from the chemical action of the sewage soon wear out. Iron pipes should only be used where a sewer is cut through a quicksand, or in similar exceptional cases where the cement joints of stoneware pipes cannot be made.

R. Y.

BETHNAL-GREEN.

SIR,—The remarks in your paper of last week concerning Bethnal-green are so much in accordance with a recent letter of mine, that I send you a copy for your use.

I may add that while the population of Bethnal-green is about 1-27th of the population of the metropolis, the pauperism is about 1-36th, but the rateable value is only about 1-64th. In consequence of this state of things, Bethnal-green receives from the Metropolitan Common Fund nearly 11,000*l.* yearly, or about 30*l.* per day, while the two (so-called) improvements in High-street, Shoreditch; and Bethnal-green will saddle the metropolis with a tax of more than 40*l.* *per day* for the next sixty years. I know of only two ways of bettering either a man's or a parish's condition. Either increase his income or lessen his expenditure. In Bethnal-green the latter is next kin to starvation. The former plan has yet to be tried.

T. G. ATKINS.

HEREFORD PASTORAL STAFF.

THE clergy and laity of the diocese of Hereford intend presenting their bishop with a pastoral staff, and have selected a design submitted by Messrs. Cox & Sons, of Southampton-street.

It will be carved out of a piece of oak which recently formed part of one of the ancient pillars of the bishop's residence at Hereford,—a twelfth-century building,—and will be surmounted by a crook of the usual form, enclosing a carved figure of our Lord, seated as a king, holding an orb and cross in the left hand, the right hand erect in the act of blessing.

The crook will be mounted in silver, with crockets also in silver, jewelled and embossed; and from the lower part of the crook there is a floriated bracket supporting an angel with displayed wings, carrying a silver shield bearing the name of the diocese, in enamel. The bands, crockets, and bases will be enriched with carbuncles in ornamental settings, and cut in the ancient form, the general style of the work being that of the thirteenth century. The fashion of presenting a staff to bishops has spread: this is the ninth, we believe, given within the last few years.

RAIN-WATER TANKS.

"STAGNUM," in a recent issue, asks for more information as to coating brickwork of tanks. If good Portland cement be used with one-sixth sand a sufficient thickness is one quarter of an inch, but it should stand about fourteen days to harden properly before water is admitted. Each side should be laid on without a joining, and the angles rounded out. The bricks on which the cement is laid should be damp, and the surface clean. The cement should be well rubbed, too, and not allowed to slide while soft. Neat cement, three-quarters of an inch thick, will be more apt to crack and blow out than a thin coat. The walls of the tanks should be built with equal parts of cement and sharp sand. If in a dry situation, and lime is used for building, the lime in the joints should be well raked out, and the walls should be firm enough to resist the pressure of the water.

W. B. WILKINSON.

DAMP WALLS.

SIR,—Having erected several buildings in exposed situations in Lancashire and Yorkshire where the driving rains will often penetrate the hardest stone, I am willing to give your correspondent "Devonia" the benefit of my experience.

Walls built with rubble or coursed wall-stones consist of an inner and outer casing, which is usually filled up in the middle with small pieces or scraps of stones, and then grouted with mortar so as to make a solid mass, bond-stones being introduced to hold the two casings together. In very wet situations the rain penetrates the outer casing, either through the mortar joints or the stones themselves, and is then drawn by capillary attraction to the inside casing. To prevent this the centre should be filled in with *dry* scraps and not grouted; the water then penetrates the outer casing and runs down the middle of the wall to the foundations, so that the inner casing is left dry. The bond-stones must also be weathered or tilted outwards, so as to throw off any wet that may enter at their top bed. Window-heads should also have a thin sheet of lead or zinc laid on the top bed and turned up inside the wall, so as to prevent wet from driving in over them.

If the building is in the neighbourhood of gas-works, a grouting of hot gas-tar boiled up with some pitch, and poured into the middle of the wall as it goes up, will make it thoroughly watertight, and impart a great amount of strength and solidity; this process adds considerably to the cost of the walling, but I have found it thoroughly efficient where other methods have failed.

A coating of Portland cement gauged with two parts of sharp sand *ought* to keep the weather out in any situation, and I expect the failure has arisen from using too much sand, or some other fault in the mixing or materials.

In building with brick in an exposed situation a similar plan should be adopted; an outer casing 9 in. thick, and an inner one 4½ in. thick, are carried up together but quite distinct, leaving 2 in. between, and tying them together by means of wrought-iron bands 9 in. long bent downwards in the middle, and spread out flat at each end so as to have a hold on the wall. This method is much used in the neighbourhood of Southampton.

Inside walls and partitions, if built of stone, will often show damp for a long time after they are built, as all stone contains in its natural state a considerable quantity of water, which is evaporated by the internal warmth of the building, and will appear like a sweat over the surface, through any number of coats of paint. It is therefore advisable to use brick for internal linings and partitions in preference to stone.

E. WYNDHAM TARN, Architect.

CARBONIFEROUS limestone, some beds of the lias, slate rubble, and a few other stones, where used for walling, have a tendency to condense the atmospheric vapour, causing it to trickle down the face of the work, and prevent the use of paper.

A wall, properly coated outside with Portland cement, cannot admit rain. The defect is doubtless in the nature of the rubble backing, and the only remedy is to batten the inner face of the wall, using iron holdfasts to fix the battens, and packing them off the wall about ½ in., the wall to be pierced by a few interstices left in the joints under the eaves course and under the floor-line, to allow a current of outer air to circulate behind the battening, to preserve the wood and, as far as possible, to dry the moisture from the face of the rubble. The joints of the floor-boards should be grooved and tongued, and the wood skirtings tongued into the floor-boards, to prevent undue draughts of air in the rooms.

A SUB.

SIR,—To either paint or cement the exterior of any building generally interferes with the design. I consider the best plan is to deal with the inside walls in the following manner:—Take off the old plaster from the walls that are damp, and put on a rendering coat of the best Portland cement, without sand, about ½ in. thick; then put on a coat of equal parts of Parian cement and sand, to bring the wall to a level surface; and afterwards a finishing coat of Parian cement alone, of about the thickness of one-eighth of an inch; and when this last coat is setting, which you will notice by its changing colour, give it a coat of paint mixed up with very little oil in it, the object of which is to keep the chemicals used in the manufacturing of it from rising to the surface, often throwing off the paper if this is not done. This plan I have tried many times, and have never found it to fail. Of course, a great deal depends upon the cement being used properly, and it being of the best quality.

JOHN RUSCOE.

AN ODD OBJECTION.

LAMBETH WORKHOUSE.

AT the last meeting of the Lambeth Board of Guardians, Mr. R. Taylor complained that although Mr. Parris was the architect of the new workhouse, yet his partner interfered in various matters. He thought if this course was pursued, they might involve themselves in some difficulties.

Mr. Higgs said no order for work could be given by the architect for a sum exceeding 25*l.* without the sanction of the Board.

After a discussion, it was agreed that the clerk should write to the architect, and request him to attend the Board personally upon all matters connected with the new workhouse.

SCHOOL-BOARDS.

London.—AT the last meeting, on the 24th inst., Mr. Reed, M.P., moved the adoption of a Report from the Works Committee, calling to mind that the Board, on the 9th of August, requested the Works Committee to consider and report upon the question of obtaining architects and securing designs. The Board further resolved, on the 10th of January, 1872, that the system of class division should be tried on the Essex site, in Stepney. The Works Committee now recommended that, for the erection of this school, there should be a competition of architects, not exceeding twelve in number; that it should be referred back to the Works Committee to advertise for candidates, to select a number not exceeding twelve, and to submit the plans prepared by the competing architects to the Board. This recommendation gave rise to a long discussion, the result of which was that the whole matter was referred back to the committee, principally for the purpose of their finding out a larger site. On the motion of Mr. Reed, M.P., the Works Committee were empowered to recommend the engagement of four agents for two months, at a salary not exceeding 2*l.* per week, to assist the architect in looking out for sites, and premises to be hired, in those blocks in which the Board has decided, or shall hereafter decide, on the recommendation of the Statistical Committee, to erect schools.

Leicester.—At a meeting of the Board for discussion with Mr. J. R. Blakiston, Her Majesty's Inspector of Schools, Alderman Burgess said he wished to ask a question with reference to the sort of schools for which they would require architects. It seemed to him that they could not stir a step with the architects till they had

settled what kind of schools they were to build, as they must give them instructions. Their British Schools were built exactly in accordance with the plan recommended by the British and Foreign School Society. They had not been built above ten years before they found they had made a great mistake; they had altered and altered four times since the schools were built, and it had involved them in great expense. Of course they all felt that it was exceedingly desirable that they should start well, on the best possible system; and perhaps the inspector would give them his idea how they could get the best possible system of laying out their schools, and have them built so as to accommodate the children in the best possible way. The British schools at present wanted another remodelling, as the inspector would agree, but how to do it he did not know. He thought they would have most carefully to consider the plans of their schools, and he should like to ask whether the Department had arrived at any conclusion on this point, or issued any direction or suggestion to the School Boards on this subject. Mr. Blakiston said he thought not. If they adopted the present system of pupil teachers they had hundreds of models to go by; and if they adopted the Prussian system they must inquire abroad. The Rev. R. Harley said he understood the inspector to mean that if they adopted the Prussian system they would have to be guided very much less by the experience of the past than otherwise; but if they adopted the old system he was in favour of large schools,—at least, large schools were more economical, and that if they put in thoroughly efficient men they were the most efficient schools, but the difficulty was to get the men to manage them. Mr. Blakiston said, the largest school he had in his department was a school of 300 boys, but not many masters could manage it.

Derby.—At a meeting of the local School Board a report of the School Plans Committee was read. It stated that,—

"On Monday, the 8th of January, your committee met to receive the plans sent in. The clerk reported that he had received eleven sets of plans under seven different marks or mottoes, viz., three plans marked 'Alpha,' two marked 'Education,' one marked 'Lætus Honore,' one marked with a 'Red Spot,' two marked 'Nota Bene,' one marked 'Prodesse quam conspici,' and one marked 'Non Semper. . . . .' At the adjourned meeting on Wednesday, the clerk reported that he had received on Monday evening three other sets of plans marked 'In Spe': as these were sent in after the time appointed they were not admitted for competition. In making the selection which they submit to the Board for adoption, your committee have been guided by the consideration of light, ventilation, and internal fitness for school work, rather than by the external appearance of building. The question of cost also has been duly considered by the committee in their selection. After very mature deliberation your committee resolved to recommend the plan marked with a 'Red Spot' as the first; 'Nota Bene' as the second; and 'Lætus Honore' as the third. On opening the sealed envelopes, it was found that the selected plan had been prepared by Mr. T. Coulthurst, architect and surveyor, No. 10, Wilmot-street; the second by Messrs. Giles & Brookhouse, architects, St. James's-street; the third by Mr. G. Sheffield, architect, Bank-chambers, Derby."

The confirmation of the committee's report was unanimously agreed to. Mr. Beswick then moved, as a substantive motion, that Mr. Coulthurst be appointed the architect for the superintendence of the erection of the new schools in Gerard-street, and that the premium of 10*l.* offered for the second best plan be awarded to Messrs. Giles & Brookhouse. The proposition was carried unanimously. A building committee was also appointed to carry out all needful measures in connexion with the erection of the new schools in Gerard-street, the committee to consist of the chairman, the vice-chairman, Mr. Thompson, Mr. Shaw, Mr. Holmes, and Mr. Roe. The clerk was empowered to apply to the Education Department for a loan of money needful to erect the new schools in Gerard-street, so soon as it should be ascertained what was the sum required for that purpose.

CARRIAGE ACCESS TO THE THAMES EMBANKMENT.

IN the Vice-Chancellor's Courts (before Vice-Chancellor Sir John Wickens), The Marquis of Salisbury *v.* The Metropolitan Board of Works, is a suit instituted in reference to certain land reclaimed on the Thames Embankment, opposite the end of Salisbury-street and Cecil-street, and which has been laid out as a garden. The garden is surrounded by railings, the gates being locked at night, and the question turns on the construction of the Act of Parliament authorising the construction of the Embankment, under which rights of access are reserved to the Marquis and his tenants. The case was being heard on an interlocutory application for a motion for an interim injunction. It appears that the Marquis has in contemplation the erection of a large and important class of buildings upon this low level ground, and it is in respect to the erection of these that he seeks immediate relief, by injunction, for the purpose of enforcing his right of road from the Embankment-road across the ornamental gardens. The question mainly depends upon the interpretation to be put upon Section 62 of the Thames Embankment Act, 1862, which has special reference to this property.

The Vice-Chancellor, in delivering judgment, said, the question was whether the property to which the reservation contained in the 62nd section referred is limited to Cecil-street and Salisbury-street, or whether it includes the low-level ground also. Without desiring to express any final opinion on the point, his Honour intimated his view that the reservation was solely for the benefit of the owners and occupiers of Cecil-street and Salisbury-street. The word "tenants" must be held to mean future tenants of houses in those streets. If it had been intended to comprise future tenants of the low-level also, he could not see why the low-level should not have been specifically mentioned. The right of the plaintiff to a carriageway from the Embankment to the low-level ground was too doubtful to be enforced on motion for a mandatory injunction; but, as at present advised, his Honour thought that the inhabitants of Cecil and Salisbury streets had a right, at least, to a footway at all times across the ornamental gardens to the Embankment-road. Holding this view, he directed the motion to stand over until the hearing of the cause.

INDEX TO THE "BUILDER."

SIR,—I cordially second the proposition of your correspondent, that you should publish a useful Index and Reference to the *Builder* (at the end of the year) from the commencement—the same to form a volume of itself,—and will most willingly contribute towards its production, having been a subscriber from your No. 1 to the present time, and having all the volumes bound up.

Frequently finding great difficulty in obtaining information required without loss of time in long searches, is my reason for troubling you with this. F. E.

THE "STANDARD" OFFICE NEW BUILDINGS.

AMONGST the improvements at present in progress in Shoe-lane, the extensive buildings which have for some time been in progress for the *Standard* newspaper, and which are now approaching completion, attract notice. The premises, which have been erected from designs furnished by Mr. Parkinson, architect, form a prominent feature amongst the surrounding buildings, and altogether occupy an area of about 700 square yards, extending in the rear to a depth of 100 ft. The main elevation in Shoe-lane is 60 ft. high to the parapet, and contains a frontage of 61 ft. in length. The materials used in the ground-floor and first floor of the elevation are stone, the upper stories consisting of brick, with bold stone facings. The several entrances and windows on the ground-floor, as also the first floor, are semicircular-headed, ornamented with carving, whilst the windows of the second, third, and fourth stories, in number eight each, are segment-headed. The principal entrance is wide and massive, surmounted in the centre by a carved head, whilst between the windows of the first floor are two similar carved figures, somewhat smaller in size, with the words "*The Standard*" in large characters, cut out of the stonework. The interior arrangements and fittings of the structure are, or appear to be, very complete. Apartments in the third story are specially devoted to a large library and reading-room for the use of the employés on the establishment. Immediately adjoining are the new premises erected for Messrs. Dellagana, for stereo- and electro-type purposes, and which are also approaching completion, under the same architect; Mr. John Anley, of Brunswick-place, City-road, being the contractor for both.

CHURCH-BUILDING NEWS.

Godstone.—The parish church has been enlarged and re-opened. The work was done by Mr. Carruthers, of Reigate, after the designs of Mr. Gilbert Scott, architect, who has retained all the relics of antiquity found during the work. The cost of the restoration amounted to about 4,000*l.*, of which sum 1,000*l.* were given anonymously by "A Friend." Mr. Macleary, of Pendell, also contributed 800*l.* On the opening day the sum required only amounted to about 300*l.* The works carried out included the removal of a south transept, the galleries and pews also being swept away, the building of a south aisle, restoration of tower, including the raising of the steeple 16 ft., the opening of the roof of nave, the insertion of a west window, and west and south doorways according to remains found. The west doorway (as also the south) is Norman. This is formed of stone given by Mr. F. M. H. Turner, of Leigh-place, who also gave the stone used for the external work. Stone from the quarries here (of which Henry VII.'s chapel at Westminster is built) is used for the arches, columns, &c., the walls being lined with stone from Kent. The seats are open, and of oak. The pulpit remains the same, but the stone base has been carved. A porch of oak has been built on the south side, near to which door the font is placed. It was intended at first to have a winding staircase to the ringing-floor at the south-west corner of the tower; but on the removal of the old vestry, &c., traces were found of the original staircase at the south-east corner. This had been at some time completely cut in two from top to bottom; it has been restored. The tower, which is now open to the church, has a low carved stone screen separating it from the chancel: in it is placed an effigy, executed in white marble, of the late Mrs. Macleary. A groined oak roof has been placed in it, and the quaint windows are filled with stained glass. The paving is, we believe, to be of coloured marbles. This is at the cost of Mr. Macleary. A new treble bell has been given by Mr. Thomas Rose. A three-light window on the south side has been filled with stained glass, representing the "Good Shepherd," by the family of the late Mr. W. Stenning, of Godstone Court. The east window was already of stained glass, put in by subscription to the memory of the late Archdeacon Hoare. The window on the south of the chancel has been put in by Mrs. Hoare as a memorial to the same: it contains figures of King David and St. Cecilia. The reredos, of stone, has seven arches, the columns being of red marble: it is carved. The east wall on either side is lined with encaustic tiles, and above is the legend on a gold ground, "Holy, Holy, Holy, is the Lord of Hosts; the whole earth is filled with His glory." Above this is a cornice of quarry stone, carved by the rector. The pulpit was carved by him when the chancel was restored a short time since.

Pateley Bridge.—The Church of St. Cuthbert was re-opened on Thursday, December 21st, by the Rev. Bishop Ryan, of Bradford, after having being closed for some time during alterations. The gallery has been removed, and the old pews have been replaced by stalls. A stone pulpit and reading-desk have been erected. The alterations have been carried out by Mr. Grange, of Pateley, from the designs by Messrs. T. H. & F. Healey, architects, Bradford. This is one of the Parliamentary churches of the early part of the present century. A system of decoration has been employed in order to deal with the unbroken monotony of the interior. The wall of the nave has been arranged in three divisions of colour. The dado is brown; forward to the springing of the window arches, it is citrine, relieved between each window by a centre ornament containing Christian emblems; above that it is of a deep buff powdered, with conventional roses and *fleurs-de-lis* in brown. These divisions are marked by borders on vellum grounds. The chancel, reredos, and tablets are illuminated in both stencilled and painted ornament. The whole of the decoration was done by Messrs. S. Bottomley & Sons, of Crosshills, *viâ* Leeds.

Beddington.—The most recent additions to St. Mary's Church consist of a new east window. The window and reredos erected at the same time as the north wing, and which were there during the Rev. J. Hamilton's rectorship, have been removed. The new window is not so deep by about 2 ft. as the one it replaces; the object being seemingly to allow the new reredos being raised. Cut in the basement stones of the arch over the window outside are *fac simile* heads of the present Bishop of Winchester (on the left hand), and on the right that of the present rector of Beddington—taken from portraits. The chancel screen has also had surmounted upon it a carved oaken cross. The screen on the west wall of the north wing is also completed, and is formed of a carved oak frame gilt, filled in with a painting of the Last Judgment. The chapel, which is undergoing repairs, is also nearly completed.

Great Yarmouth.—The topstone of the new north-west pinnacle of the south-west aisle of the parish church has been completed. The pinnacle has been finished at an expense of about 200*l.* the cost being defrayed for the most part by the ladies of the congregation.

Romiley.—The design of St. Chad's Church, Romiley, has just been completed externally by the erection of the spire. The new spire rises to a height of 130 ft. It is octagonal in shape, rising with broaches from the top of the tower and belfry-stage. It is surmounted by an iron cross and a gilt cock. The work has been carried out by Mr. S. Norcross, from the designs and under the superintendence of Messrs. Medland & Henry Taylor, the architects for the church. The cost has been only 260*l.*

Maryport.—The foundation-stone of a new church has been laid at Maryport. The proposed building is intended for a Mission Church in connexion with St. Mary's Church at Maryport. The site is on the north side of the harbour. The church, when completed, will seat about 500; and the estimated cost of erection is, we understand, from 1,200*l.* to 1,400*l.* It has been designed by Mr. Eaglesfield, of Maryport, architect.

Snargate.—The old parish church of Snargate has been re-opened, after its repair and restoration. The arches of the aisles and tower were hidden by unsightly boardings, and the old interior was a sad picture of what in so many of our churches has been the result of many generations of niggardly neglect and bad taste. All this is here changed, and the dimensions of the building are opened up, the nave and aisles are laid out with appropriate sittings, still leaving an open space to the west, from the font to the tower arch. The architect, whose plans have been adopted throughout, is Mr. C. T. Whitley, of Dover. The work of the chancel was executed by Mr. Ames, of Brenzett, and that of the body of the church by Messrs. Adcock & Rees, of Dover.

Bishopsgate, London.—A new chapel and schools for the district of Bishopsgate have been opened. The new chapel has been erected on the site of the Church of All Saints, Skinner-street, Bishopsgate-street Without, and, with the underlying schools, is capable of accommodating 500 boys. There are 300 sittings in the chapel, and 200 in the class-rooms underneath. Gothic of the plainest and most useful possible kind is the style of architecture of the new chapel and schools, and Mr. E. N. Clifton has been the architect, and Mr. Brass the builder. Very few persons beyond those immediately concerned, says the *Clerkenwell News*, know anything about the Great Eastern Railway Additional Powers Act. It empowered the Great Eastern Railway Company to take down the Church of All Saints, Skinner-street, in consideration of the payment of a certain amount of money compensation to the parish in which the church was located. In due time the money was forthcoming. Then came the question, what should be done with it? Should a new church be built, or what? After a good deal of deliberation on the part of the parochial authorities, they came to the conclusion that, in consequence of the great diminution of the population caused by railway incursions, and the consequent sweeping away of thickly-populated districts, it was undesirable to build another church in a thoroughfare so near the parish church, and a chapel, in which religious services, school business, and meetings and entertainments might be carried on, was decided upon. To do this, an Act of Parliament was necessary. A Bill on the subject was introduced into Parliament in 1869, which was supported by the Archbishop of Canterbury and the Bishop of London, and which, after some opposition, became law. The result is the chapel and schools which were opened on Friday last.

SCHOOL-BUILDING NEWS.

Birdsall.—The new pile of buildings, including school and master's residence, situated near the entrance to the park at Birdsall, have been opened by Lady Middleton, who laid the foundation-stone on the 8th of May last. The school is built from designs superintended by Mr. Parsons, his lordship's agent; the contractors being Messrs. Dodsworth & Wood, Malton, for the masonry and joinery work, and Mr. Smiddy, Malton, for the plumbing.

Reedham.—A new infants' and mixed school, with a master's house attached, has been opened at Reedham. It is conveniently situated on Maypole-hill, the land on which it stands having been given by Mr. W. Jary, of Reedham Hall. The external walls of the building are constructed of red brick, with black and white brick and stone dressings, and a large stone window is inserted in the north end of the school-room, smaller windows being introduced on the western side. The building, which has a lofty, open stained roof, costs, with the fencing, about 800*l.*, and will accommodate 200 children. Mr. W. P. Pearce, of Orford-hill, Norwich, is the architect; and the contractor is Mr. J. Withers, of Blofield.

Langport.—The new schools at Aller, near Langport, have been opened. The building is composed of white lias, and occupies an elevated site on the slope of a hill above the rectory grounds. It consists of a general school-room, 33 ft. 6 in. long by 17 ft. wide, plastered, ceiled, ventilated, and lighted; a class-room, 13 ft. by 12 ft.; and cloak-room, 8 ft. by 6 ft. 6 in. At the southern end is a cottage for the schoolmistress.

Boxford.—A new schoolroom, which has been planned and built by Mr. Wooldridge, of Hungerford, has been opened here. The Rev. G. F. Wells, at the opening, said,—For thirty years your rector, Mr. Wells, has endeavoured to obtain such a room as this. Last year the Government ordered that such a room should be built, for remember that, however good it looks, owing to the skill and care Mr. Wooldridge has shown, it is only built according to the requirements of Government for ninety children. The owners of property agreed to provide part of the means to build this school, the Government, the National Society, and the Diocesan Board to supplement that sum, so that now the room in which we are assembled is completed, and the cost of it will soon be paid.

Chester.—The new schools which have been erected in connexion with the Roman Catholic Church of St. Werburgh, in Queen-street, have been formally opened. There was sufficient ground, without infringing on the old graveyard, to admit of the erection of new schools without destroying the old school, that having been converted into an infants' schoolroom. The new building is a plain one, brick-built, covering an area 55 ft. by 45 ft. On the basement is the boys' school, which may be entered by two different doors from Union-walk. The principal room would be square, but for the projection of two buttresses, which are necessary to carry the timber supports of the upper school. Although these buttresses would be found to be objectionable when holding a meeting or entertainment, as they are continued upwards to the cross timbers of the roof, yet they afford corners for classes, which the teachers will know how to utilise. To each large room a smaller class-room is attached. All the rooms are lofty, well-lighted and ventilated, and will be warmed, the larger rooms by two Gill stoves in each, and the class-rooms by a fireplace in each. The entrance to the girls' school and also the infants' school, which, as already said, is the old school, is from Queen-street; and the upper school-room of the girls is reached by a broad winding staircase. Separate play-grounds and out-offices are attached to each school; and the internal fittings include new patent desks, which serve the threefold purpose of form and desk, form and table, and seat with sloping back. The schools were designed by Mr. Edmund, of Liverpool, and the builder was Mr. Andrews, of this city. The total cost is about 1,400*l.* It is estimated that the schools will accommodate 600 children.

Books Received.

"BRICKYARD CHILDREN: an Answer to the Charges of Mr. George Smith against the 'Tileries,' Tunstall. By Jno. N. Peake. Grant & Co." In this pamphlet Mr. Peake makes a vigorous, indeed over-vigorous, reply to the allegations lodged against his own establishment, and adduces evidence to show that it is well managed. Our own observations, however, on the miserable condition of brickyard children as a class were founded on the examination of many yards, and are indisputable. The interference of the legislature was loudly called for.——"The Illustrated Price Book for 1872 (Sprigg, Great Russell-street)," includes a considerable amount of useful information appended to the lists of prices.——"Mechanical Arithmetic and Mensuration. By Charles W. Merrifield, F.R.S. London: Longmans, Green, & Co. 1872." This treatise has been written as one of a series of text-books on science. It is not meant to be the first book of one wholly uninstructed in the elements of arithmetic. It gives elementary rules the precision and illustration which they need for the farther pursuit of the subject, and to the higher rules a gradual induction. The previous knowledge, however, assumed to be possessed by the student need not be great in quantity or high in quality, and all that the book contains is well known and established. There is a chapter on mechanical work, but nothing in the way of mathematical invention or discovery. The work is adapted to the use of artisans and students in public and other schools. The author is principal of the Royal School of Naval architecture and Marine Engineering.——"The Transfer of Gas-Works to Local Authorities." By Arthur Silverthorne, C.E. London: Livermore & Robinson, Bedford-street."—The purpose of this pamphlet appears to be, to advocate the adoption of gas-works by corporate and other local public authorities,—a purpose which harmonises with our own efforts while engaged in past years in getting up and supporting the gas movement for the reduction in price and improvement in quality of the gas supplied by companies to the public. We are glad to be able to give so promising a list as the following of towns throughout England, where the exclusive control of the gasworks is now vested in the Local Board, Corporation, or Improvement Commissioners, for the time being, namely:—

Aberavon, Abergavenny, Beverley, Bingley, Birkenhead, Bradford, Blackpool, Burnley, Burton-on-Trent, Bury (Lancashire), Buxton, Carlisle, Chorley, Cleckheaton, Darlington, Devizes, Doncaster, Malvern, Halifax, Haverfordwest, Keighley, Knaresborough, Leeds, Leek, Lytham (Lancashire), Macclesfield, Manchester, Middlesbrough, Newton (Lancashire), Oldham, Richmond (Yorkshire), Ripon, Rochdale, Rotherham, Salford, Southport, Spalding, Stockport, Stockton, Teignmouth, Tenby, Wallasey, Walsall, Widness.

Thus it will be seen that the number of towns that have adopted the system of directing their own gasworks does not bear an inconsiderable proportion now even to the number of companies incorporated under special Acts of Parliament. The latter reckon at the present moment, in England and Wales, about 250, and the proportion of unincorporated gas companies to the former is in the ratio of 4 to 1. In Scotland, the towns in which the gasworks have been vested almost all lately are, Dundee, Glasgow, Perth, Paisley, Renfrew, Greenock, Arbroath, Kilmarnock, Forfar, Aberdeen.

Miscellanea.

Metropolitan Fire Accidents.—According to the usual annual report just laid before the Metropolitan Board of Works by Captain Shaw, the total number of fires to which the members of the Fire Brigade were called during the past year was 2,056. As compared with the previous year, this shows a decrease of 104. No fewer than 38 lives were lost by fire during the year. The strength of the brigade at present is as follows:—50 fire-engine stations; 93 fire-escape stations; 4 floating stations; 51 telegraph lines; 82 miles of telegraph lines; 3 floating steam fire-engines; 1 iron barge to carry a land steam fire-engine; 8 large land steam fire-engines; 17 small land steam fire-engines; 16 7-in. manual fire-engines; 56 6-in. manual fire-engines; 13 under 6-in. manual fire-engines; 104 fire-escapes; 387 firemen. The number of firemen employed on the several watches kept up throughout the metropolis is at present 107 by day, and 169 by night, making a total of 276 in every 24 hours; the number of those sick, injured, on leave, or under instruction, is generally about 40; the remaining men are available for general work at fires. It remains to be seen what the result of the Metropolis Water Act of last session will be, but it may be hoped that the provision for constant service, which comes into force on the 21st of April this year, will have the effect of at least making every fire-plug represent an immediate supply of water.

Adulteration of Gas.—The amalgamation of the gas companies does not appear to have been beneficial so far as the citizens are concerned. No doubt the amalgamated companies could, if they would, sell good gas cheaper than if they were not amalgamated; but, as we predicted at the time, they would not though they could. They are up to all such nefarious devices as tradesmen and manufacturers practise in the adulteration of their goods; anything, in their opinion, seemingly, being good enough for the stolid fools who allowed them to "amalgamate." Their gas, we should think, is common air illuminated by a little carburetted hydrogen, just as London milk is water tinctured with the product of the cow; and it saves cost to allow the sulphurous and other abominations of the vilest coal to go along with it, and so the public have their supply of brimstone gratis direct from the manufactory. As appears from the Court of Common Council proceedings, sulphur is more prevalent than ever it was in the gas supplied to the City; and in many instances the consumers' bills, notwithstanding the reduction of price from 4s. to 3s. 9d. per 1,000 ft., are larger than formerly.

Accident at a National School in Salford.—An accident of an alarming nature has taken place at the National School-room in St. George-street, Salford, by which a number of young children sustained injury, and narrowly escaped losing their lives. Several workmen have been engaged in making alterations and additions in the school-rooms, and this work had not been fully completed when the children resumed their attendance at school for the first time. While the children in the infants' department were assembled, two gasfitters employed by Mr. Livingstone had passed through a trap-door to the ceiling under the roof, and continued their work immediately over the heads of the children. They were walking about, when all of a sudden the weak materials upon which they were standing gave way, and carried the two men, along with a large quantity of *débris*, down upon the children below, some of whom were for a time completely buried underneath it. The dimensions of the part of the ceiling which fell were about 18 ft. by 11 ft., and it was estimated that it weighs nearly a ton. The children were got out bruised and bleeding, but fortunately it was found that, with one or two exceptions, the injuries were not so serious as to excite apprehensions of grave results. The teacher was badly hurt.

Perils of Timber Stacks.—Last Sunday afternoon an accident, which unfortunately resulted in the instantaneous death of two little children, occurred at Mr. Bowman's timber-yard, adjoining the river at Low Elswick, Newcastle. Elizabeth Muckle, aged six years, and Thomas Henry Charlton, aged four years, had strayed from the house of their parents into the yard adjoining, in which a large quantity of thick, heavy battens were piled up in stacks. How long they were there is not known, but within a few minutes of three o'clock passers-by were startled by the crash of falling timber and a loud scream. This was enough to give the alarm, and several gentlemen at once climbed the rails into the inclosure, and then discovered that about a couple of tons of timber had toppled over, burying the two poor little companions beneath the mass. When the timber was removed, a frightful sight presented itself, and both the children were dead. It is supposed that they had been playing on the top of the timber, when the stack fell over and buried them beneath it.

The Work of the Telegraph.—It appears, with regard to the progress of the telegraph system under the Government management, that while in the financial year ended the 31st of March, 1871, the messages amounted to 9,850,177, those for the current financial year ending the 31st of March next (estimating the remaining quarter according to the average of the preceding quarters) will reach 12,410,726,—an increase of 26 per cent. The total number of offices open on the 5th of February, 1870, when the business was taken over by the State was 2,932, and it is now 5,098. These 5,098 consisted of 3,291 postal offices and 1,807 railway telegraph offices. The great augmentation has been in the postal offices, which have risen from 1,058 to 3,291; those in the London district having increased from 177 to 361, in the West of England and Wales from 605 to 1,979, in Scotland from 155 to 321, and in Ireland from 122 to 560.

The Theatre in Shakspeare's Time.—On Saturday afternoon last Mr. W. B. Donne, the examiner of plays, commenced a course of lectures in the theatre of the Royal Institution, "On the Theatre in Shakspeare's Time." Mr. Donne started at almost the very birth of dramatic writing, and traced in an interesting and instructive manner the various improvements noticeable from time to time in the construction and the general treatment of the English language. The writers of Elizabeth's time and their works were particularly dwelt upon. Some extracts from the latter were read, for the purpose of showing the point of improvement at which English literature and the drama had arrived immediately before Shakspeare made his first appearance on the scene.

State of Dwellings in Limehouse.—A report laid before the last meeting of the Limehouse Board of Works by the medical officer of health for the district describes the houses in Victoria-place, Limehouse, as being in a condition unfit for human habitation, and the Board has resolved to proceed against the owners of the property under the provisions of the Artizans' and Labourers' Dwellings Act.

The Titley and Presteign Railway.—The first sod of the projected railway from Titley to Presteign has been turned at Presteign, amidst general rejoicing. Presteign is the county town of Radnorshire, and an important centre of business for the county. The projected line, when completed, will be about five miles in length, and will cost about 23,000*l*. It will form a junction with the Leominster and Kington Railway, near Titley. It will probably in a short time be continued on towards Rhayader and the Central Wales line. Another line has been partly constructed from Eardisley to Kington. Direct communication will then be made with the immense fields of industry in South Wales. Lime will then find a ready demand at the hands of the South Wales iron-masters, and coal will be cheapened. The contractors for the line are Messrs. Perry & Sons, of Stratford, London; and the engineer, Mr. W. Clarke, C.E., of London.

Proposed Trades Hall for Manchester.—A meeting of delegates from the various trade societies in Manchester has been held at the Typographical Institute, Water-street. Mr. S. C. Nicholson occupied the chair. The Rev. H. Solly having addressed the meeting, the following resolution, proposed by Mr. W. H. Wood, and seconded by Mr. J. M'Kenna, secretary of the Coachbuilders' Society, was adopted:—"That premises be secured for a social club for the accommodation of the trade unionists of Manchester and Salford as near the centre of the city as possible, to be opened to members contributing 5*s.* per annum, rooms in the same to be let for the accommodation of trade societies at reasonable rentals." Mr. W. H. Wood, in support of the scheme, urged that such a club would answer exactly the same purpose as those occupying a higher grade in the social scale.

Removal of a Toll.—The *South London Chronicle* says,—"That obnoxious obstruction, the halfpenny hatch in Baalzephon-street, which so long placed a barrier to free communication between Bermondsey and Newington, has at length been removed; and now the hundreds of workmen whose nearest route to their daily labour lay through the hatch can take the nearest cut, and laugh at all that remains of almost the last remnant of a bygone system of tollage. We may add that the Bermondsey vestry, sensible of their position as non-obstructors, have determined to remove the only public bar which now exists in the parish,—*i.e.*, the one that blocks up Smith's-buildings, Edward-street. There still remains the toll on Waterloo Bridge. Now that the City has done thus much for Bermondsey, is it not time that the Metropolitan Board tried to give a like relief to the whole of London?"

Royal Dublin Society's School of Art.—The annual exhibition of the students' works of this school has been opened to the public free daily. The grand staircase, long statue gallery, and adjoining rooms are filled with art works hung and catalogued to the unprecedented number of 607, comprising drawings of the human figure, landscapes from nature, architectural drawings, and surface designs. The silver medal for architecture was awarded to Mr. J. Bouchier for a drawing made from actual measurement of the Royal Dublin Society's House; also in orthographic projection and perspective and practical geometry bronze medals were awarded, the recipients being Mr. Beardwood, Mr. Robert Smith, and Mr. Tighe. For some of the designs for cabinet, damask, fans, dinner-plates, lace, surface decoration, carpeting, and wall paper, the leading manufacturers offered first and second prizes of 5*l.* and 3*l.* Mr. Lyne is the head master, and his assistants are Mr. Byrne and Mr. Murray.

The Park-lane Sewer.—In the St. George's, Hanover-square, Committee of Works, General Sir William Codrington, according to notice, moved "That the surveyor lay before the Committee of Works and the Vestry a plan and sections of the main drains of Park-lane and Piccadilly towards the south end of Park-lane; also of plans and levels of any house-drains in that neighbourhood which communicate with the main sewers, and of which complaint has been made." His only object in this motion was to obtain the requisite information. Mr. Walker seconded. Mr. John Morris suggested that a plan of the basement of Gloucester House should be added. Mr. Cove thought, now that the sewer in Park-lane was working in a satisfactory manner, the motion seemed unnecessary. The motion, being put, was carried.

Effects of the Gale.—A very heavy gale visited the metropolis on Tuesday night, accompanied with torrents of rain. Many accidents are reported, and amongst them is the fall of one of the large pinnacles from the central tower of the Westminster Palace. Destructive floods are reported from many parts of the provinces. At Chelsea the gale was severely felt, and a stack of chimneys fell down in Lower Sloane-street, causing the death of a lady named McGarth, who resided at No. 77. It appears that between the house in question and No. 76, which was occupied by Mr. Bancks, the well-known dyer, was a high stack of chimneys, and about half-past five, when the gale was at its height, the stack fell with a tremendous crash, half falling through the roof of No. 76, and the other half through 77. The storm raged with great fury at Cambridge. In fact, there was a perfect hurricane of wind and rain. Buildings in course of erection in various parts of the town were blown down.

Tradesmen and International Bazaars and Exhibitions.—A public meeting, convened by the Metropolitan and Provincial Association for the Defence and Advancement of Trade Interests, has been held in the Egyptian-hall, at the Mansion House. The chair was occupied by the Lord Mayor and Mr. Alderman Finnis successively. The meeting was numerously and respectably attended. The following resolutions,—

"That this meeting views with regret and alarm the determination of the Royal Commissioners to convert the International Exhibitions at South Kensington into enormous retail shops; and pledges itself to use every loyal means to prevent the intended scheme being carried into effect;"

"That the following gentlemen, with power to add to their number, do form a standing committee for the purpose of removing the grievance already complained of, by a humble address to her Majesty, petitions to the Houses of Parliament, and by using all other available means to oppose this objectionable scheme:—The Lord Mayor, Mr. Alderman Finnis, Mr. R. Crawford, M.P., Sir Robert Carden, and Messrs. Attenborough, Daniell, Copeland, Gotto, Blackwell, Pedler, Harrison, and P. Graham, with power to add to their number,"—

were separately moved, and unanimously passed, by the meeting.

A "Quarter-Turn Full-Way High-Pressure Water Valve."—In reference to a valve so named the inventors, Messrs. Carr & Claret, sanitary engineers, state that it "opens full bore with a ¼ turn, and can thus be used in all situations in which the ordinary cock is applicable," so disposing of the objection (often raised with respect to valves) of a number of turns, and that, "unlike all previous valves, it is *actually* a *full-way* valve," whereas, "even the so-called round way cocks are not *absolutely* full way, while most valves and common cocks are little more than half full way." The disc which closes the aperture (in other words, the valve proper) is fitted with ¼-in. solid mineralised indiarubber, which is said to be, in practice, almost imperishable, when used even for boiling water. The cost of the valve is said to be much lower than even the commonest valves yet made. It ought to come into use.

The Park-lane Improvement.—At the St. George's (Hanover-square) Committee of Works, a letter was read from the Metropolitan Board of Works, asking the vestry to assume the charge of the new foot and carriage ways in connexion with the Park-lane improvement. The surveyor (Mr. Tomkins), in answer to questions, said that the roadway in Hamilton-place was now in excellent condition. A short time ago, 3 in. of granite kerb were laid down. Mr. Walker said the road was as good a road as any in the parish. The committee decided to take to the road in accordance with the request of the Board; and it was understood that the refuge at the top of Hamilton-place would be removed, it being considered dangerous.

Masters and Men.—The proprietor of the West Central Iron-works, Drury-lane, and the South-Western Iron Foundry, Paradise-street, Lambeth, Mr. George B. Cooper, having conceded the nine hours per day to his workmen, from January 1st last, they presented him, on Monday evening, January 15th, with an address, accompanied by a silver inkstand, designed and manufactured specially by Messrs. Elkington. Mr. Cooper received the present with much feeling, and in speaking of the movement, said it had his support, and he hoped that the time acquired by his men would be used for their moral and mental improvement. His son, Mr. L. E. Cooper, afterwards read an address to the workmen.

Value of Land in London.—The freehold property, Nos. 27 and 28, Milk-street, Cheapside, was sold at the Mart by Messrs. Debenham, Tewson, & Farmer. It consisted of two old houses, covering a site of 1,780 ft., and realised 8,650*l.*, or over 4*l.* 17*s.* per foot.——With reference to a paragraph we quoted in our last from a City paper, as to a sale of land in Lombard-street, a correspondent acquainted with the circumstances writes to say that "it gives a false impression as to the value of land per foot. The amount in question comprised compensation for a retail business, and there are other exceptional matters connected therewith, which would reduce the value referred to, which I, as one having taken a prominent part therein, can well testify to."

Instruction in Science and Art for Women.—By permission of the Lord President of the Council, a course of six lectures, on the most celebrated and influential composers of Italy, France, England, and Germany, for the clavecin and the pianoforte, in connexion with the general history of music of the eighteenth and nineteenth centuries (illustrated by performances on the pianoforte), will be delivered on Monday afternoon, the 5th, 12th, 19th, and 26th of February, and the 4th and 11th of March, at half-past two o'clock precisely, by Mr. Ernst Pauer, in the Lecture Theatre, South Kensington Museum.

Junior United Service Club House.—This building, situate in Charles-street, St. James's-square, had a narrow escape from being destroyed by fire on Monday night. It appears that the members, during the whole of the day, had experienced a smell of burning wood, and at last flames were seen playing round one of the pillars in the coffee-room on the ground floor. On making a closer inspection it was found that the ceiling, to the extent of 35 ft., with the wood lining and supports, was on fire, and that the flames had actually penetrated the flooring in the first floor. With the aid of a number of Shand & Mason's hand-pumps the fire was extinguished. The cause of the fire has been traced to a defective flue.

The "Abbotsford Grate."—The bars are placed close down upon the hearth, the space for the fire being lined at the sides and back with fire-brick, and instead of a grate forming the bottom, a fire-brick lump, fitting into and resting on a cast-iron tray, forms the bed upon which the coal is burnt, and all are so constructed as to be renewable at any time without unsetting the grate. It is said that "the warming power of the grate is in excess of the ordinary construction, in proportion to the amount of fuel burnt, and the fire-brick lump at the bottom secures the most complete combustion."

A New Theatre in South London.—We understand that a new theatre is about to be erected in Newington-causeway, not far from the Elephant and Castle inn. The site is said to be the extensive premises, situated on the western side of the road, and until recently occupied and known as the Steam Wheel Works. It is stated that the new building, the erection of which is immediately to be commenced, will be on a very extensive scale, and large enough to hold an audience of more than 3,000 persons.

The Hull Water Supply.—A report to the Hull Corporation Waterworks Committee on the proposed additional works for the supply of the town from Springhead, by the engineer to the waterworks, Mr. Thomas Dale, has been printed by authority. It develops three several plans,—one for pumping all the water for the town's use direct from Springhead, at a cost of 79,814*l.*; the second, for supplying the west district direct from Springhead, at a cost of 61,372*l.*; and the third, for supplying water to the Stoneferry works from Springhead, at a cost of 26,977*l.*

Endowment of the Convalescent Hospital, Dundee.—Sir David Baxter, bart., of Kilmaron, offered to the directors of the Dundee Infirmary, a few weeks ago, to build a convalescent hospital for from fifty to sixty inmates, at a cost of from 6,000*l.* to 8,000*l.* He also promised to give the sum of 10,000*l.*, provided an equal amount were given by others, for its endowment. Sir David has now written to the chairman of the infirmary, intimating that the other 10,000*l.* has been subscribed by his private friends, and that Messrs. Shiell & Small are preparing the deed of constitution.

Church-Building at Aldershott.—It is proposed to build a new church at Aldershott capable of accommodating 1,000 persons.

Ventilation of the Court of Queen's Bench.—The bench, the bar, and the reporters at the Court of Queen's Bench joined in complaining on Saturday of the ventilation of that court. Mr. Manisty having to apologise for the loss of his voice through a severe cold caught in the court, Mr. Justice Blackburn wished that matters might be re-arranged, so as to give the bench a little of the air of which the bar appeared to have too much. From other parts of the court there were equally emphatic complaints on the same subject.

The Royal Academy.—The election of two Associates to fill the places of those who were admitted into the rank of Academicians Elect in November last,—viz., Mr. Dobson, the painter, and Mr. Lumb Stocks, the engraver, is to take place on the 29th of the present month. The candidates whose names have for a length of time been on the list of those who desire to belong to the Academy and have put down their names in accordance with the custom adopted, number, according to the *Daily News*, no fewer than 64 painters, 15 sculptors, and 13 architects.

Institution of Surveyors.—At the ordinary general meeting, held on Monday, January 15th, the adjourned discussion on Mr. Clutton's paper, entitled "The Cost of Conversion of Forest and Wood Land into Cultivated Land," and Mr. Grantham's paper, entitled "Agricultural Pipe Drainage in connexion with Arterial Drainage and Outfalls," was resumed, and, after a long debate, concluded. At the next meeting, January 29th, a paper will be read by Mr. E. J. Smith, entitled "Land."

Concrete Gas-holder Tank.—We have been informed that there is now in course of construction at the South Metropolitan Gas Company's premises, Old Kent-road, a concrete gas-holder tank, 152 ft. in diameter, by 38 ft. 6 in. deep to top of rest stones. We believe that this is the first instance of concrete being adapted for this purpose. The work is being carried out by Messrs. Thos. Docwra & Son, from designs by and under the direction of Mr. G. Livesay, the company's engineer.

The Leicester Municipal Buildings.—No official reply comes to our inquiry as to carrying out the selected design, but we have received several letters reiterating it, and expressing hope that the council intends acting fairly. The selected design, it should be understood, is the joint work of Mr. T. Barnard, of Leicester, and Mr. William Smith, of John-street, Adelphi, London.

Islington Workhouse.—The plans for the alteration of the old workhouse in Liverpool-road, Islington, have been laid before the Local Government Board, who have replied, through their architect, to the effect that no answer can be given for some weeks to come. In the mean time, the guardians have resolved to proceed with the demolition of the old buildings, so that they shall be ready to proceed with the new ones as soon as the plans are approved.

Luxembourg Cathedral.—This building has been lighted with gas by Messrs. Cox & Sons, of Southampton-street. Massive standards, the bases iron, and the upper parts in polished brass, with foliations, introducing coloured crystal jewels are used for the nave, and a number of polished brass brackets, of a design to correspond with the standards, have been supplied for various parts of the building.

Bangor Cathedral.—The restoration of the Bangor Cathedral, says the *Rock*, has come to a standstill. About 5,000*l.* are still required, and the means at the disposal of the committee are exhausted. Lord Penrhyn, who has contributed 3,000*l.*, has undertaken works which will cost 2,000*l.* more. Mr. Kneeshall offered 100*l.* if nine others will give a like amount. The bishop, Mrs. Campbell, the dean, and Lord Boston have already given in their names.

Aberdeen Builders.—At a meeting of the representatives of the employers of the building trade (with the exception of the masons) in Aberdeen, it has been resolved to intimate to the men their willingness to concede that the hours of labour, after the 1st of June, be fifty-two per week, without reduction of pay.

Utilisation of Sewage.—The Banbury Board of Health has agreed to purchase an estate, at a cost of 23,400*l.*, for the purpose of utilising the sewage of the district. An examination has been held by a Government commissioner, no opposition being offered.

Sculpture in Spain.—The municipal council of Madrid have invited a competition among the artists of Spain to decorate the Plaza de la Independencia with six or eight statues of the heroes of the War of Independence.

TENDERS

For building new rectory house, at March, Cambridgeshire. Mr. William Smith, architect:—

Swann, jun.	£2,590 0 0
Broadhurst	2,468 0 0
Law & Son	2,378 0 0
Hutchinson	2,309 0 0
Bennett	2,160 0 0
Brown (accepted)	2,020 0 0

For rebuilding rectory house, at Doddington, Cambridgeshire (destroyed by fire). Mr. William Smith, architect:—

Richardson & Son	£4,249 0 0
Thompson	3,982 0 0
Brown	3,962 0 0
Law & Sons	3,667 0 0
Bell & Sons	3,654 0 0
Fast (accepted)	3,550 0 0

For erecting new farm buildings, &c., on Dodd's Charity Estate, at Kimblewick, Bucks. Messrs. Brown & Foulkes, architects:—

Syred	£478 0 0
White	473 5 0
Fitkin	444 5 0
Callam	409 10 0
Batting	403 10 0
Mayne & Son	332 0 0
Snell	321 13 3

For the erection of a house, Elmsleigh, Leicester, for Mr. John Stafford. Messrs. Picton, Chambers, & Bradley, architects. Quantities supplied:—

Hobson & Taylor	£8,777 0 0
Bayes & Ramage	8,182 0 0
Thompson	8,110 0 0
Hughes	7,900 0 0
Urmson	7,787 0 0
Stevenson & Weston	7,770 0 0
Eagle	7,400 0 0
Loveday	7,350 0 0
Messrs. Herbert	7,048 0 0
Osborn, Brothers	6,789 0 0
Barnes & Moody	6,595 0 0
Neale & Sons (accepted)	6,499 0 0

For rebuilding a warehouse, in Cannon-street, City, and alterations and additions to five adjoining. Mr. Herbert Ford, architect. Quantities supplied by Messrs. Karslake & Mortimer:—

Meyers & Son	£11,801 0 0
Higgs & Son	11,186 0 0
Hill, Keddle, & Waldram	11,170 0 0
Brass	10,710 0 0
Conder	10,529 0 0
Perry & Co.	10,335 0 0
Gammon & Son	10,063 0 0
Stimpson	9,993 15 0
Turner & Son	9,643 0 0
Scrivener & White	9,533 0 0
Williams & Son	9,488 0 0
Brown & Robinson	9,464 0 0
Henshaw	9,261 0 0
Killby	9,200 0 0
Perry, Brothers	9,173 0 0

For alterations to union workhouse, at Pwllheli. Mr. R. G. Thomas, architect:—

Lloyd	£1,194 0 0
D. Williams	989 0 0
Griffith	989 0 0
Messrs. Roberts	947 0 0
J. Jones	834 0 0
W. Jones	800 0 0
J. Williams	765 0 0
R. Jones	752 0 0
Griffiths (accepted)	721 0 0

For new house, at Menai Bridge, for Mr. R. G. Thomas, architect:—

J. Williams	£748 17 2
E. Williams	660 0 0
Thomas	590 0 0
J. Williams	580 0 0
R. Jones	562 0 0

For the erection of new tavern and outbuildings, on the new Sussex Cricket-ground, Hove. Mr. J. Woodman, architect. Quantities supplied by Mr. B. H. Nunn:—

Cheesman & Co.	£3,320 0 0
Parsons	2,090 0 0
Nash & Co.	2,084 0 0
Patching & Son	2,076 0 0
Lancaster	2,067 0 0
Blackmore & Howard	1,995 0 0
Lockyer	1,955 0 0
Anscombe	1,949 0 0
Barnes	1,924 0 0

For new house and business premises, on the Stoke Lodge Estate, Guildford, for Mr. W. Tucker. Mr. Henry Peak, architect:—

Burdett	£609 15 6 1
Moon	606 10 0
Mason	595 0 0
Strudwick	590 0 0
Garnett (accepted)	538 12 0
Swayne	398 11 0 1

For teacher's house, and enlarging the national school buildings, at Compton, Surrey. Mr. Henry Peak, architect:—

Messrs. Loe	£605 0 0 1
Hibbins & Co.	528 0 0
Moon & Son	495 0 0
A. Moon	480 0 0
Sturdy	475 0 0
Mitchell (accepted)	475 0 0
Strudwick	469 0 0
Mason	464 5 0
Lucas	440 12 0
Cooper	313 0 0

For Bexley Bridge, Kent. Mr. Martin Bulmer, architect:—

Booker	475	0	0
Lacy & Co.	451	0	0
Lucas	422	10	0
Webb	412	0	0
Featherstone	400	0	0
Blake	395	0	0
Dover & Co.	357	0	0
Allard (accepted)	340	0	0

For Drayton Schools, near Abingdon:—

	House.			School.		
Whiting & Tosland...	£471	0	0	£779	0	0
King	408	0	0	812	0	0
Wheeler & Gregory	467	0	0	680	7	0
Williams	341	0	0	690	0	0
Bryan (accepted) ...	300	0	0	670	0	0

For repairs and alterations at the St. George's Baths and Washhouses, Buckingham Palace-road. Mr. W. R. Gritten, architect. Quantities supplied:—

Colwill	£765	0	0
Thomas	728	10	0
Allard	687	16	0
King & Son	670	0	0
Wright	628	10	0
Sale	621	0	0
Nichols & Goodair	602	0	0
Bennett	596	10	0
Biggs	586	0	0
Jenner	560	0	0
Pullen	555	0	0
Rogers	550	0	0
Kearly	530	0	0
Woodcock	530	0	0
Carter & Son	457	0	0

For the erection of St. John's District Projected Schools, Woolwich:—

Wagner	2,995	0	0
Messrs. Hosking	2,987	0	0
Lord	2,981	10	0
Johnson	2,766	0	0
Mann	2,727	0	0
Priestley	2,680	0	0
Gibson	2,677	0	0
Lonergan	2,672	0	0
Waterson & Co.	2,650	0	0
Kirk (conditionally accepted) ...	2,464	0	0
Shepherd	2,400	0	0
Hughes	2,364	0	0

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NOTE.—The responsibility of signed articles, and papers read at public meetings, rests of course with the authors.

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The Builder.

VOL. XXX.—No. 1513.

The Rude Stone Monuments of all Countries.

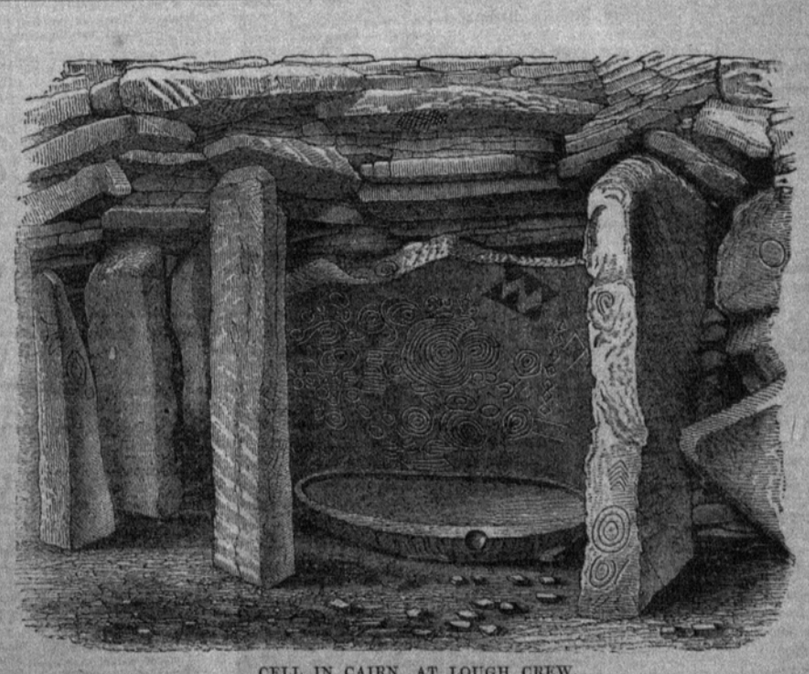
IT is something new to see Stonehenge and monuments composed of unhewn stones regarded as specimens of a style of architecture, divided into periods, and credited with architects. Hitherto, antiquaries have looked upon untooled monuments as mainly pre-architectural and possibly pre-historic. But Mr. James Fergusson has now elaborated an idea, slightly outlined by him about ten years ago, and, in a copiously illustrated work on "Rude Stone Monuments," endeavours to draw these wonderful relics within the confines of architecture and history, and arrange them in a sequence.* His creed is that all groups of untooled stone are comparatively modern; and that those of the East, especially, are very late attempts to imitate ancient magnificence.

Our own great circles of unhewn stones he attributes to King Arthur. Their use or meaning has been a puzzle to antiquaries for centuries. Many conjectures have been made, from the days of Tudor and Stuart archæologists to our own, concerning them, but these are all folded up and neatly shelved by Mr. Fergusson, who insists that these monuments are trophies raised on the battle-field in the strong hour of victory. With a victorious army on the spot, it would have been easy to raise a monument of this kind in a week, he urges; and then he proceeds to identify the sites of several of our largest circles with Arthur's famous battles. Curiously, from want of knowledge of the locality, probably, he is inclined to shift the site of the first battle from the glen mentioned in the old writings into Dumfriesshire, near Lochmaben, where there happens to be a circular inclosure corresponding in particulars with that at Penrith, known as Arthur's Round Table. But Northumbrian antiquaries boast that there are few districts in the United Kingdom so rich in ancient camps, fortlets, incised rocks, cultivated terraces, and other signs of an early and numerous population as that through which the Glen flows; and, consequently, as the army was composed of the population in those days, none more likely to have been the scene of a great gathering in momentous times. The sites of the second, third, and fourth battles are unidentified, but the fifth is thought likely to be represented by one of the Cumberland circles, near Penrith; the sixth is associated with remains at Bas Lowe, in Derbyshire; the seventh with the Salkeld circle, or else with the Grey Yawds, near Cumrew; the eighth is laid in Wales, from its Welsh name, Guin; the ninth is thought likely to have been Caerleon, in South Wales; the tenth, on the River Ribroit, is unidentified; the eleventh is supposed to have been at Stanton Drew, where stands a set of monoliths so impressive as to be chosen by Mr. Fergusson for the frontispiece of his work, and which we are enabled to reproduce; and the twelfth is represented by the great circles and lines of huge stones at Avebury. It is said of many things that they are too good to be true; and this association of our most mysterious monuments with our most mythical monarch is so delightful that we are afraid it must be another of those superlatively good fictions.

Before going further into the author's array of facts brought forward in support of his view of the recent date of rude monuments, we would throw out the hint that, without including the mention of the circular temple by Diodorus, some of the old Greek legends seem to indicate the presence of huge stones in artificial groups at a period prior to the writings of the Greek poets. Whosoever looked upon the head of Medusa, for instance, is said to have been changed into stone. As Perseus travelled homewards with it, he is recorded to have turned a whole army into stones by exposing it to view; and when he arrived at the court of Polydectes, he only held it up before the eyes of that monarch and his scoffing courtiers and they were instantly changed into stones. Could it be shown that there are, in Greece, circles and groups of stones similar to those of which Mr. Fergusson treats, we should have to consider whether or not it was their presence that dictated such fables to the poets. If we found there was a circle of stones in the island of Sirephos, where Polydectes kept his court, and rows, or groups, either drawn up in battle array or scattered in apparent confusion, on the spot associated with the rescue of Andromeda, and the subsequent battle with her suitor Phineus, should we not have grounds for believing that the legends were adapted to these relics? If these rude stones were known to the builders of the polished stone buildings of ancient Greece, the theory of their recent date must fall to the ground.

We would, too, remove a misconception concerning the absence of circles in Wales. Mr. Fergusson assumes there are none either in Anglesey or in any other part of the Principality, although there are many dolmens. We refer to the work of the Rev. Henry Rowlands, entitled "Mona Antiqua Restaurata, 1766," and find he illustrates the remains of a stone circle in the township of Tre'r Dryw, Anglesey, and mentions a finer one of forty-two stones as situated between two mountains near Cesail Gyfarch, in Carnarvonshire. And this painstaking author wrote of Anglesey, "There are also up and down many remains of pillars and erected columns in all these precincts; some single and some ranged in circles; most of them broken and cast down." Furthermore, he endeavoured to ascertain whether there were any particular traditions attached to them by the simple Welsh people, and could find none but what was represented by their familiar name, Arthur's Quoits. This last fact is especially worthy of note, because a similar term popularly applied to another group of rude remains, at Gower, near Swansea, assists Mr. Fergusson to settle the site of one of Arthur's battles.

With regard to Stonehenge, we are assured there is no reason to doubt the truth of the statement of Geoffrey of Monmouth. This Mediæval scribe distinctly states that Ambrosius erected Stonehenge in memory of the three hundred British nobles who were treacherously slain by Hengist when partaking of his banquet at Amesbury. If, deplores Mr. Fergusson, he had been content with this unvarnished statement, no one would ever have doubted it; but, unfortunately, he embellished it, by adding that the great magician Merlin brought the stones from Ireland. This flight of fancy cast a doubt upon the whole narrative; but it need not have done so, for we have only to read that some of the stones were transported from Ireland, without the aid of magic, instead of by that agency, and all is clear. As is well known, some of the stones belong to rocks that are not found in Great Britain, but are common in Ireland, and the transport of these rarer blocks from that country may have been the foundation of Geoffrey's report. Mr. Fergusson thinks that though the native style fell into abeyance during the Roman occupation, it still flourished in Ireland, and was selected by Ambrosius, or recommended to him by Merlin, as most suitable for the national memorial of the three hundred nobles. Following Geoffrey still further,



CELL IN CAIRN, AT LOUGH CREW.

* Rude Stone Monuments in all Countries: their Age and Uses. By James Fergusson, D.C.L., F.R.S., &c. London: John Murray. 1872.

he suggests that the pairs of blue stones within the choir were placed there to the memory of Aurelius and Constantine, who are said by that historian to have been buried within "the structure of stones which was set up with wonderful art, not far from Salisbury, and called in the English tongue Stonehenge." In effect, he bids adieu to the temple and tribunal theories, and to the Druidical serpent idea, and proclaims the erection of this Giants' Dance, as it has been figuratively called in old times, to have commenced in the year 466, and concluded in 470 A.D. It is, he declares, the most effective example of megalithic art ever executed by man. "The Egyptians and Romans raised larger stones, but they destroyed their grandeur by ornament, or by their accompaniments; but these simple square masses on Salisbury Plain are still unrivalled for magnificence in their own peculiar style."

We have said that Mr. Fergusson arranges the various kinds of rude stone monuments into a sequence. He begins with the kist, or kist-vaen, found in sepulchral tumuli, as his first "period." The buried chamber for several interments is the first step forward. As such a structure could not be externally completed till all the intended burials were made in it, considerable delay must have occurred in some instances, and the next step would suggest itself as a remedy for this inconvenience. This is the external entrance piercing one side of a tumulus to communicate with the central chamber. So far so good, doubtless.

We next find him setting out as a fact that the buried chamber, when composed of large unhewn stones, was the predecessor of the open or free dolmen, or cromlech. The next step to leaving them uncovered was to elevate them on the summits of tumuli. Some writers have supposed that all the dolmens we now see uncovered were once buried, and are only now exposed to view because the mounds of earth have been removed. This supposition Mr. Fergusson holds as improbable, and even impossible; for, he urges, the supports of the capstones are not sufficiently close to have prevented the earth falling into the central chamber, in the course of the formation of the mound over it. The capstone of the dolmen at Pentre Ifan, in Pembrokeshire, is large enough, and sufficiently high from the ground, to admit of four or five persons on horseback taking shelter under it. It is not likely, he argues, that any men would take the trouble to hoist this stone on to its supports merely to hide it again directly under a tumulus; for a stone one-third or one-fourth its weight would have answered the purpose of a roofing-stone equally well. But, he continues, "the mode of architectural expression which these stone-men best understood was the power of mass. At Stonehenge, at Avebury, and everywhere, as here, they sought to give dignity and expression by using the largest blocks they could transport or raise; and they were right; for, in spite of their rudeness, they impress us now; but had they buried them in mounds, they neither would have impressed us nor their contemporaries." It will be seen that the term "stone-men" here used is not to be taken in connexion with the archæological divisions of stone, bronze, and iron, for which, indeed, he shows but cold appreciation. After the rude stone-monument builders had raised their dolmens to the top of their tumuli, their progress is not so easy to trace. But that the circle is one of the latest forms of rude stone architecture seems to him certain. The demi-dolmen also appears to be a late and economical invention.

In comparing Eastern with Western dolmens, Mr. Fergusson finds what he considers to be unmistakable proofs of a common source. In Asia, as in Europe, the same successive forms of burial are indicated,—the kist, the chambered tumulus, the elevation of the kist on to the top of the tumulus in the open air, and, finally, the formation of the circular hole in one of the slabs of it. In the most ornate of Indian tombs, this parentage is pointed out. The rails round it represent the circle of stones round the rude monument; the domed tomb is the tumulus; and the tee on the top of it is the elevated external kist-vaen. In the case of the Lanka Ramayana Dagoba, of which a view is given, there is, moreover, unnoticed by him, another mysterious association of ideas indicated in the presence of a series of concentric circles on the side of the tee shown. "That a people might both bury in barrows and erect domical cairns to contain relics, would not necessarily involve a proof of the one form being copied from the other; but that both should be surmounted by a simulated sarcophagus or shrine, and both surrounded by one, two, or three rows of useless stones, points to a direct imitation of the one from the other which can hardly be accidental," presses the author. Many would suppose that the ornamental tomb is the development of the rude monument formed of unhewn stones; but he has arrived at exactly the opposite conclusion, as we remarked at the outset. Wood being the earliest building vehicle in India, and having regard to the curiously attenuated pillars of this particular monument, he considers that the Lanka Ramayana Dagoba is an adaptation in stone of forms previously wrought in wood, and that the unhewn-stone monuments are but rude and late attempts to copy these early efforts in polished stone; and as it is allowed that no hewn stone buildings were erected in India before the year 250 B.C., the date of the rude stone monuments must be placed a long time after this period,—probably as much as five or ten centuries. There has been no break, he believes, in this manner of building from the time it was commenced till the present day.

An interesting feature in the work is a map, illustrating the distribution of dolmens, and showing the probable lines of migration by the dolmen builders. India, and Syria, and the Circassian coast of the Black Sea, are the chief seats of these relics in Asia, as far as our present information goes. But as the thousands now observed in North Africa were unknown to us twelve years ago, we are justified in assuming that there may yet be discoveries of more in other localities. Italy and Greece are still unexplored, for we may take the solitary dot in each country as evidence of this fact rather than of the absence of dolmens. The south, west, and northern coasts of Spain, show an almost uninterrupted chain of them, the Andalusian coast being the only gap. One of the lines of migration stretches from the African coast to Granada, across the Mediterranean; and another line shows a communication between Africa and France, the chief dolmen country. From Spain, Mr. Fergusson gives two more lines of migration northwards, the one landing upon the south coast of Ireland, to account for the mysterious connexion of the Irish Milesians with Spain, and the other sailing along the west coast, touching at two points, till it was met by a line coming from the Orkney Islands and Norway. From France he shows two short lines crossing the English Channel to land in Cornwall and Devonshire. Kent and York were reached by emigrants from Holland and Hanover; and Northumberland was gained by an independent migration from Sweden and Jutland. Central Europe has yielded only occasional traces of dolmen builders up to the present date.

Every one really under the influence of the attraction of these enigmatical remains of an unrecognised people will look through Mr. Fergusson's labours with pleasure, although, as he is the first to admit, and we fully believe, he may not have found the right clue to the mystery of the subject. His impression is that the dolmens, like the circles, all belong to a period subsequent to the commencement of the Christian era, and he shows what he thinks some very good reasons for assigning them this late date. Mr. Baker's account of a cromlech-building Indian tribe, which still continues to bury in cromlechs, is one of the strongest arguments that could be urged, though by no means conclusive. The presence of a dolmen in the centre of the courtyard of a ruined Sivite temple, at Iwollee, in Dharwar, of which a view is given, again speaks for their modern erection, for it is difficult to believe that the Sivite priests would have sanctioned the erection of a temple close to a tomb belonging to a dispersed tribe; and as their building is a thirteenth or fourteenth century edifice, it follows that this particular dolmen must be late indeed if erected there after the temple had been ruined.

A still more striking reason for a belief in the recent date of some of them is presented in the case of the dolmens at St. Germain-sur-Vienne, near Confolens, in Poitou. Here we have a huge unhewn capstone, measuring 12 ft. by 15 ft., and of proportional thickness, raised upon five columns, of Gothic design, whereof one has now fallen; which columns, as if to preclude the supposition that they were hewn out of solid blocks similar to those that support the generality of dolmens, are each composed of three separate pieces,—a base, a shaft, and a capital. "Doubt seems impossible with regard to this," says Mr. Fergusson, triumphantly: "it is a dolmen pure and simple, and it was erected in the twelfth century. In itself the fact may not be of any very great importance, but it cuts away the ground from any *à priori* argument as to the age of these monuments. It does not, of course, prove that they are all modern, but it does show that some of them at least were erected after the time of the Romans, and at an era extending far into the Middle Ages." Spain furnishes another remarkable case in point. Within the walls of a church, at a place called Arrichinaga, about 25 miles from Bilboa, in the province of Biscay, are preserved huge, cumbrous, unhewn stones, which appear to be parts of a dolmen. That these great blocks should have been enclosed in a Christian edifice, is at the least exceedingly singular, if the fact does not warrant the author's assumption that veneration for them must have been felt when it was built. At Kerland, in Brittany, there is a demi-dolmen, from which uprises a cross, as though some early convert was buried below, whose relatives still adhered to the traditional form of sepulchre.

We are enabled to reproduce some of the illustrations of these important evidences given in support of the author's position.*

We have a large amount of new matter on the score of Irish rude stone monumental antiquities. The great battle-fields of Southern Moytura and Northern Moytura he explored, with the assistance of Sir William Wilde's knowledge of the locality, and made out their wonderful story by the aid of their dolmens with single, and double, and treble circles, and circles without central dolmens, cairns, and other relics; more than this, he examines into the question of the date of these battles, and shifts it down the scale of events from the high place the old writers gave them to the first century before or after the birth of Christ, which, of course, enables him to fit this vast field of antiquities neatly into his theory. About eight years ago a range of twenty-five or thirty cairns was first noticed, on Slieve na Calliagh, the hags' or witches' hill, near Brugh na Boinne, the whole of which have since been opened by Mr. Conwell. One of the most perfect of these tumuli, 116 ft. in diameter, is surrounded by thirty-seven stones as a retaining wall, and, on its north side, has a large stone set back from this circle, which is fashioned into a rude seat, and covered with the identical cup markings and concentric circles that have been recently found inscribed on rocks in so many parts of England and Scotland. There is a central chamber on this tumulus whereof twenty-eight of the stones are ornamented with similar and additional sculptures. Another tumulus contains a chamber, 29 ft. deep and 13 ft. across, with similar ornamentation on its walls and pillars, in the centre of which lay one of the largest of the low flat basins, whose use is still a matter of wonderment, that has yet been found. Below the basin were charred bones and forty-eight human teeth, a few jet objects, and a syenite ball. Pieces of pottery, bone implements, and more charred bones were found in various parts of the chamber; but though the sculptures appear to Mr. Fergusson to have been engraved with a sharp metal tool, there were no metal objects to be seen. One of Mr. Conwell's drawings representing this chamber we give. Our author supposes this range to be the cemetery of Talten, celebrated in Irish legend.

As might be expected, the early monuments of Scandinavia and North Germany occupy some prominence, likewise, in the volume. It is, doubtless, the Scandinavian battle-fields that have given Mr. Fergusson the courage to assume that our own circles are memorials of battles. One of them, at Kongsbacka, has similar alignments, he perceives, to those at Dartmoor, Ashdown, and Karnac, and this is assigned to the fifth century. No event in history, he affirms, is better known than the fight on the Braavalla Heath, in Östergothland, where the blind old King Harald Hildetand was vanquished by his nephew, Sigurd Ring, and it does not seem to admit of doubt but that the circles and cairns on the heath commemorate the event and contain the ashes of the slain; and yet this field is nearly identical in its appearance with the Irish battle-fields at Moytura mentioned above. This similarity causes him, in fact, to falter in his opinion as to the builders of the Irish circles, and to ask whether they may not have been erected by Scandinavian Vikings on the occasion of a descent upon the west coast of Ireland.

* See p. 80.

In spite of the haze that has settled over this branch of archæology, Mr. Fergusson believes that it will yet be possible to unravel the history of its great pilings and grave circles and lines of grey stones. Continuous researches have done much for the monuments of Egypt, Babylon, and Nineveh; and are likely to do as much for the remains under consideration. Meanwhile, he places great stress upon the fact of the classic writings containing no allusions to them. He asks whether such an artist as Cæsar is likely to have passed them over; especially, as when he watched the fight between his galleys and the fleet of the Veneti in the Morbihan, he probably stood on Mont St. Michel and among the stone avenues of Carnac. The Romans, too, occupied Old Sarum during their stay in England, and one of their roads passed close to Silbury Hill; yet there is no allusion to Stonehenge or Avebury in anything that is written. The same silence is observed with reference to the dolmens in France. It is true Diodorus mentions a circular temple on an island belonging to the Hyperboreans; but his statement is so vague that it is impossible to identify the island. Under these circumstances, the author thinks himself approaching the truth in assuming that the bulk of our rude stone monuments belong to the period succeeding the Roman evacuation. Of those who have investigated the subject for themselves, some will receive and some will resent Mr. Fergusson's interpretations; but all who look into his book and examine his two hundred and thirty-four illustrations will be gratified. We should give but a limited idea of the scope of the work, the principal object of the present notice, if we omitted to add that the monuments of the Mediterranean islands, Western Asia, North America, Central America, and Peru, are also described as fully as those of the parts of the globe already mentioned. On another occasion we shall discuss Mr. Fergusson's theory, and show what reasons there are for believing he may be wrong.

THE ANTIQUE: ITS STUDY OR ITS RESTORATION.

WE are glad to learn that advantage is being taken of the reproductions of antique sculpture at South Kensington, as well as of the resources of the Art Library and Museum, to bring into definite and accessible form the rules of symmetry observed by the great artists of antiquity. It is extraordinary that it should have been left to the present time to accomplish so much needed a work. One valuable result, however, is evident, from the collection, in one spot, of accurate copies of the most famous statues, as well as of the manuscripts, drawings, and rare books which are so accessible in the Art Library. A few years ago, months or even years would have been needed in order to carry out that accurate investigation which may now be accomplished in weeks. To visit Rome, Florence, Naples, Paris, and the British Museum, in order to take measurements of the Apollo Belvidere, the Venus de' Medici, the Toro Farnese, the Venus of Milo, the Torso of Cupid, the Theseus, and other noble works of ancient art, is, in itself, an undertaking. Permission and aid for the purpose of artistic investigation would have been more readily asked than obtained. And, in inquiries of this nature, there are constantly fresh references to former observations, rendered desirable by the continuance of research, that are all but impossible when the objects of examination are scattered through the museums of Europe.

The indescribable and magic charm of antique Grecian sculpture is felt by all those who have ever crossed the threshold of the temple of art. The cause of this charm, or rather the causes, yet baffle the investigator. Not that we are unaware of the nature of some of these causes. We know that, in ancient Greece, the symmetry of the body was a matter of deep study, and of almost religious culture. A divine gift of beauty was inherent in the blood. The climate, the topographic influence of broken hill country, of cool sea breezes tempering the heat of summer, of rocky islets tempting to a timid navigation,—the great national games, the development of strength and grace for the express purpose of victory in the *palæstra*,—all tended to enhance this gift. Female beauty was impersonated as a goddess. Various forms of manly symmetry engaged the care of the sculptor. The ponderous muscular form of Hercules; the lithe, fleet, angry majesty of Apollo; the saucy grace of Cupid; were all regarded with the same reverent love with which Raffaelle or Murillo dwelt on the incidents of the Divine Life. The greatest of Greek philosophers mentions magnitude of size as the first virtue of women; and that with as much simplicity, as if no educated man could doubt that a stature which gave promise of being productive of fine-grown children was the first quality that any one ought to seek in a wife. Little indications occur in Greek literature that show that such was indeed the habit of Greek thought; as when Xenophon mentions, with unfeigned admiration, the large and beautiful women who were to be found in the countries traversed during the expedition of the Ten Thousand.

Exact admeasurements of famous statues have, indeed, been taken at various times. In the library of the British Museum is a folio volume, containing thirty plates, on the proportions of the human body, published at Paris, in 1683, by Gérard Audran, an assistant of the sculptor, Lebrun. A German edition of this work was published at Nürenberg in 1686. Among the seventy volumes, original or translated, that bear the name of Albrecht Dürer on the title-page, is to be found the small folio bearing the quaint title, "*Vier Bücher von Menschlicher Proportion, durch Albrechten Dürer von Nurenberg erfunden und beschriben*," which is full of wood-cuts of male and female forms, and of interminable geometric investigations of the solid contents of various figures, applied to the equiponderation of the human form. The "*Trattato della Pittura di Leonardo da Vinci*" has been translated into German, Dutch, Spanish, and French, as well as into English by J. F. Rigaud; and contains hints of the utmost value, although they were never brought into definite form by the accomplished author. All these, and other yet more detailed works of an anatomical nature, are, however, far beyond either the reach or the requirements of the ordinary student.

Another mode of treatment is to be found in almost any treatise on drawing, in which complicated arrangements of squares, circles, and triangles are described around the delineations of lay figures. The whole web of diagrams may generally be traced to unacquaintance on the part of the delineator with the use of mathematical instruments, or with the simple relations of the sides of triangles. Thus, where one dimension of the person is normally or approximately equal to another, the relation is expressed by describing a circle, instead of by a simple indication of the fact. In one little work, now out of print, the ratio that exists between the base and the hypothenuse of a right-angled triangle seems to have been regarded by the author as a discovery of such novelty and importance, that he has impressed the diagram which illustrates it on the cover, as well as on the title-page, of his book.

All this learned, or unlearned, trifling, however, serves only to divert the mind of the student from an inquiry that may really have fruitful results. Can there be detected any such rules of exact proportionate symmetry either in the writings or in the works of the ancients, as to shed any light on the wonderful harmony of the forms of antique art?

We are convinced that one result of a thorough investigation of this subject will be the conviction that conventional rules were much more rigidly adhered to in the purest period of Grecian art than in the subsequent ages. How far the hands of Phidias and of Scopas were fettered by exact rules, and how far the grace and apparent mobility which later sculptors gave to their famous works arose from the neglect of the ancient canons, it will be most instructive to learn. It is clear, from some of the earliest relics of Greek art, such as the statue of Apollo found at Tegea, that Egyptian practice and example predominated over the early period of Grecian sculpture. In Egypt, what we now call the Conventional was reduced to the most perfect and durable system that can be conceived. We not only deduce this from the long series of Egyptian monuments, in which, for the ages that elapsed from the dynasty that reared the Pyramids to the Ptolemies, so little change was made in the sculptured representation of the human form; but we are in possession of the actual canon of the Egyptian draughtsmen. We find apartments, in monuments of very different date, in which the unfinished state of the walls leaves exposed to view the constructive lines by means of which these ancient artists invariably set out their work. The entire surface to be covered with sculpture, painting, or the curious combination of the two, which is known by the name of *koilanaglyph*, was marked off into squares. In the earlier period, nineteen of these squares were allotted to the height of a standing figure; in the later there were twenty-two. Every part of the frame was thus drawn according to exact and unvarying rule; and the identity of portraiture that prevails over every territorial division of the valley of the Nile, and during the reigns of at least twenty-five successive dynasties, is thus at once explained. Sculpture, in Egypt, crystallised at a date so far back as to be at present indeterminate; and the crystals kept their characteristic angles till Egyptian art itself perished under the attrition of Roman sway.

It is not to be supposed that, by exact investigation of the canon of the Greek sculptors, we shall be enabled to imitate the excellence of their work, any more than that by a careful study of the laws of prosody we shall be able to reproduce the poetry of Æschylus or of Euripides; but it is none the less true that such exact knowledge is necessary to anything like a critical appreciation of the merits of ancient art. How far this is absent from those spots where it is presumed to exist, is shown by the fact that the curators of the great national museums of London and of Paris, the British Museum and the Louvre, have each dealt with one of the most precious relics of antiquity in their possession in a manner that would have been rendered impossible by a very small amount of acquaintance with the laws of ancient sculpture.

The first of these misrenderings of the message uttered by the marbles of Greece is to be found in the case of the headless and mutilated statue of a Cupid, which is stamped by the impress of the purest times of art. To this beautiful fragment a portion of a left foot has been attached, which actually must have belonged to a figure of altogether different proportions. The height of the Cupid, when perfect, was close upon 56 in. The foot with which the statue has been accommodated measures 9¼ in. or nearly 10 in., and cannot have belonged to a figure of less than from 64 in. to 70 in. in height; besides being of a long narrow form, that indicates the female sex. The important lessons to be drawn from the study of this exquisite fragment are rendered all but valueless by this inappropriate restoration.

The case of the beautiful female figure which was discovered, in 1820, in a cave in the Island of Melos, in several different portions, and which, after a curious series of adventures, was secured by the French Government, and now forms, perhaps, the most famous treasure of the Louvre, is still more remarkable. The curators of that museum, with a devotion to their duty which forms a bright exception to much of the history of the last two years in France, secured this statue from shell and from petroleum by an interment as careful as that by which domestic affection honours the relics of the departed. In the cracking of the plaster by means of which the original fragments had been united, it became evident that wedges had been inserted at the waist, which gave the upper part of the body that inclination to the left which is one of the most puzzling characteristics of the statue. As we are familiar with the figure, a plumb-line dropped from the fontanel, or hollow at the bottom of the throat, falls altogether without the left foot. The most authoritative rules on the subject of the equipoise of figures are to be found in the works of Leonardo da Vinci, a profound master of the subject, and are accepted as artistic canons. "The pit of the neck, between the two clavicles," are his words, "falls perpendicularly with the foot which bears the weight of the body." "If the figure rests upon one foot," is another precept of Leonardo, "the shoulder on that side will always be lower than the other, and the pit of the neck will fall perpendicularly over the middle of that leg which supports the body." If the arms be extended, or if any artificial weight be carried by the figure, the position of the fontanel will be changed. But nothing but the strain of a severe effort could throw it so far from the perpendicular as is the case with the statue in question. And the idea of such exertion is entirely inconsistent with the serene majesty both of face and form.

No attempt to decide on the original position of the arms has yet been attended with success. Among the fragments of Termes and of other statues which were found on the same spot with this noble figure, was a hand holding an apple. From this hand, which has never been satisfactorily co-ordinated with the figure, the name of Venus was applied, by M. Quatremère de Quincy. There was an ancient group, of which the idea

is preserved in gems, of Venus standing by Mars, with her left arm resting on the shoulders of the god. But the figure in question can have formed no part of such a group, as the right arm of Mars would in that case have rested on her back. Neither is the countenance in any way appropriate to such a composition.

The girths of this statue, the proportion between the height and the width of the face, and the peculiar physiognomical outline of the upper lip, are not those of the antique Venus. The latter, especially, is characteristic of Juno, and the draping of the lower part of the figure, while the entire upper part is undraped, was a feature of the grand statue of Juno, by Polycletus; the idea suggested being that the Queen of Olympus was hidden from men, but visible to the Immortals. It is true that in the group of Mars and Venus there is a drapery about the lower limbs of the latter, but it falls lower, and has nothing of the composed dignity of the drapery of the Juno of Melos.

Monsieur Félix Ravaisson, *Conservateur des Antiques et de la Sculpture moderne au Musée du Louvre, Membre de l'Institut*, has written a little work of sixty-eight pages on this subject, illustrated by photographs of the statue in its different conditions, which has been published by Messrs. Hachette. The work is one of great interest and value; and the extreme beauty of the first photograph, representing the noble figure in the coffin in which it she was enclosed to be transported from the Louvre, is such, that we trust Monsieur Ravaisson will take the precaution to have a gelatine plate taken from the negative, for the sake of obtaining permanent unmounted prints, before the latter is injured or destroyed.

M. Ravaisson's little work is divided into two parts. With the first we are disposed altogether to agree, from observations as to the plumbing of the figure, made before this *brochure* reached us. There is a plate representing three restorations of the statue, using that word, not to denote modern conjectural additions, but the presentation of the antique relic in its most correct position. No competent judge can doubt either the correctness of M. Ravaisson's views on this score, or the service that he has rendered to art by their publication. It appears from a letter from Monsieur de Clarac to Count de Forbin, when director of the Museum of the Louvre, now for the first time published, that some intrigue or jealousy between the architects of the Louvre and the conservator of antiquities led to the hasty erection of this statue, without the supervision of the latter. M. Ravaisson shows, in full detail, the modifications that successively became natural from the first cardinal error of not regulating the vertical line of the figure by keeping the horizontal joint which passes through the haunches truly level. Hence wooden wedges were introduced, stopping of plaster was added, and even a sacrilegious chisel was applied to the ancient marble. Independent reasons, founded on the inclination of the figure from left to right, on that from the back to the face, on the falling of the fold of the peplum that crosses the left thigh, and on the angle at which the right foot is placed to the leg, enforce the opinion that a level bed was formed at the period of the ancient restoration of a yet more ancient statue.

With the second portion of the work, for reasons previously indicated, we do not agree. M. Ravaisson adopts the idea of M. Quatremère de Quincy that this noble figure formed part of a group of Mars and Venus. We have seen no argument that appears to us conclusive, or even plausible, for giving the name of Venus to a statue of a character so different both in proportions and in expression from that proper to that goddess. Admitting that a proud and severe dignity is the chief characteristic of the figure, M. Ravaisson thinks that he traces in it the influence of the school of Lysippus. We are sure that the process of minute measurement would lead this distinguished *savant* to reconsider this idea. Lysippus is known to have diminished the heads of his statues, and given greater proportionate length to the limbs, in order, he said, to give more mobility and appearance of life. In the Venus de' Medici this reduction of the size of the head is but too apparent—to the great disadvantage of a statue of which the figure below the throat is perfect. But in the Juno of Melos the head is proportionately larger than in any figure we can at the moment cite, except the Theseus in the British Museum. It is larger than in the Antinous or in the Apollo Belvidere. Not only is this the case with reference to the height of the head, from the apex of the chin to the scalp, but the proportion between the width and length of face is fuller, as indeed is the case with all the horizonal proportions, than in the other instances we have mentioned.

We are happy to give an English echo to the expressions of M. Ravaisson as to Restoration. It seems, he says, that the habit of restoring ancient works is a fatal habit which henceforth should be entirely renounced. Formerly it was thought correct not only to repair antiques, but to turn them out "as good as new." Portions which were wanting were supplied from the fragments of other statues. A large number of statues have at present antique heads which do not belong to them, often those of a totally different epoch, and which, in other respects, in no way harmonise with the figure. In the Louvre itself we may see more than one Greek statue surmounted by the head of a Roman personage; more than one statue of a certain god or goddess surmounted by the head of a god or goddess altogether different.

In the absence of antique fragments, recourse has been had, to supply deficiencies, to the chisels of living artists, such as Montorsoli, Guglielmo della Porta, or even Michelangelo. It is none the less true that often these restorations have caused the antique relics to lose much of their value. In the first place, they have often damaged the general physiognomy and the significance of the statue. Thus in the Louvre we see an Apollo, of Archaic Greek style, transformed, by the attributes given to him, into a *Bonus Eventus*, a Roman deity of a late age; and a Wounded Amazon, whose tunic, originally kilted above the knee, according to the costume which the ancients invariably attributed to the Amazons, has become a floating robe. Above all, we see monuments of the finest workmanship disfigured by additions of extreme mediocrity. But even if such restorations were effected with science and with talent, it is almost impossible that the work succeeding should be in perfect accord with the ancient workmanship; and thus the entire work loses the capital merit of unity of style and of execution. Finally, we must add that, sensible of the extreme difficulty of bringing the restorations into perfect harmony with the antique, the artist has almost always finished by endeavouring to bring the antique into harmony with the restorations. This has been done by giving to the surface of the Greek or Roman work, sometimes with the chisel, more often with the file, the new appearance which the restored parts present. The beauty of a great number of excellent works has thus been irremediably injured. The statue of Diana the Huntress was repaired after this fashion by Barthélemy Prieur, an able sculptor, but one who did not fear, after having restored the parts which were deficient, to retouch almost the entire surface! This fact is sufficient to explain the hesitation with which we have always regarded this statue. M. Ravaisson justly says that the execution no longer seems to arrive at the height of the conception. The same is the case with the Pallas of Velletri: the same is the case with many of the fine statues that adorn other museums of Europe, especially that of the Vatican. For this reason, some of these statues, when compared with others more recently discovered, have been referred to an epoch much too modern. If the few untouched portions of the Diana and the Pallas be carefully examined, the hair, part of the tunic, and the right foot of the former, and certain portions of the drapery of the latter, the traces of Greek workmanship are, in the opinion of M. Ravaisson, certainly to be discovered. The sublime effect of the untouched fragments from the Parthenon, preserved in the British Museum, is happily contrasted with that of the above-described restorations.

A note is added to this essay, from the pen of M. Des Cloiseaux, member of the Academy of Science, as to the chemical character of the marble employed for the statue in question. This is stated to be calcareous Parian marble; the unusual designation being due to the fact that Paros produces two descriptions of statuary marble. The first is a pure carbonate of lime, which effervesces with acids, and has a specific gravity of 2·71. The other is a magnesian marble, a carbonate of lime and magnesia, which does not effervesce with acid, and which has a specific gravity of 2·835. It further appears to M. Des Cloiseaux that the upper part of the statue is not cut from marble of the same quality as the lower part, the grain of the former being somewhat finer, and the colour a little more yellow, than is the case with the latter. We should like to see a similar test applied to the Cupid which we previously mentioned.*

LAND.†

THE commercial uses of land are mainly of two kinds;—the one as the foundation for buildings for residence, and for trade and manufacturing and commercial purposes; the other as the basis for the production of food; and there is, in addition, its use for social enjoyment.

It is admitted that any one possessing, as the produce of his own exertions or of those of his predecessors, money in any form, save in that of land, may use it in any way he sees fit; but it is maintained that if the money be invested in land, the owner is to be regarded rather as a trustee for the good of society, which has a kind of primary charge upon all land. I have never seen this suggestion practically applied, except to owners of agricultural land.

Adam Smith, in his "Wealth of Nations," written in 1790, deemed it necessary to devote a chapter in refutation of the theory that land was the only source of wealth: the tendency to regard agricultural land as the source of all wealth still influences many minds.

Our earliest impressions convey to us the notions that the blessings of Providence are those of corn and wine and oil, and cattle on a thousand hills, and they are extended to those of the market, the counting-house, the iron-works, or the manufactory, only by an effort of the mind. A town operative never hears of any blessings of townspeople, beyond those shared in common with the agricultural and the pastoral labourer. Our classical reading strengthens these impressions; for the Greeks and Romans, having little trade, and that in the hands of slaves, regarded commercial occupation as servile. The leading idea of our poetry is that "God made the country, and man made the town;" and the feudal tenure of land is the basis of our legal system, into which the customs of merchants have been with some difficulty intruded. However small the parcel, land requires a solemn deed for its conveyance; while a cargo of iron worth 10,000*l.* may change hands by a pencil memorandum.

Yet the utmost that the most energetic agriculturist can do by increasing the produce of his land sinks into insignificance when compared with the additional value conferred upon it by its appropriation to commercial purposes. The cost of building is much the same in the City of London and in the agricultural districts, and the interest required on such expenditure is also much the same; but the site upon which a business has been built up by several generations (operating, perhaps, over the whole world) derives a value from the very magnitude of the revenue obtained upon it; and, as a fact, realises a value unattainable for land in any other form.

For commercial purposes, the value of land ranges from the rate of 1,000,000*l.* to the rate of 200*l.* for an acre; for agricultural purposes, it ranges from 200*l.* to 2*l.* for an acre; and for social enjoyment, seldom exceeds 200*l.* an acre. For many years the first division has been always increasing in this country, the second division constantly becoming more productive by the increased amount of capital available for its amelioration; both rising in value with the increasing wealth of the country. The rate of 1,000,000*l.* for an uncovered acre of land is obtained in the best parts of the City of London, 400,000*l.* at Liverpool, 100,000*l.* in Westminster, and prices, decreasing from those amounts down to 200*l.* an acre in the vicinity of small towns, and for sites of manufacturing works and for residential purposes, are obtained from land previously devoted to agricultural cultivation.

The rate for an acre of the most valuable uncovered land in the City of London, after the Great Fire in 1666, was 30,000*l.*, and it is stated that the value of the land was then one-third of the value of the property after it had buildings upon it. At the present time the highest rate for uncovered land may be taken at 1,000,000*l.* an acre, and such value constitutes fully three-fourths of the value of the property after it has buildings upon it. The increase is thirty-fold.

* Since writing the above we observe an announcement that the intended work on Symmetry to which we referred is from the pen of Mr. Conder.

† By Mr. Edmund James Smith, member. Read at the Ordinary General Meeting of the Institution of Surveyors, January 29th; Mr. Thomas Huskinson (vice-president) in the chair.